

H I G H L I N E F A R M I N G M A R K E T

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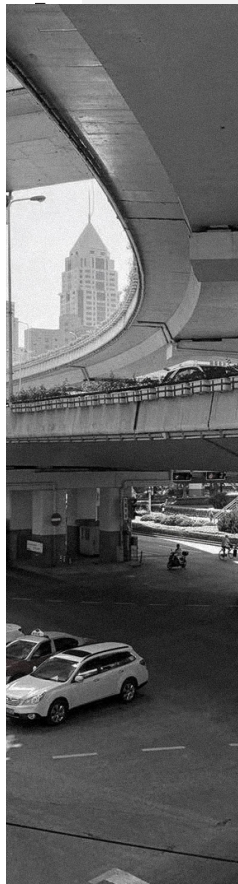
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THE CONTEMPORARY PROJECT

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HIGHLINE FARMING MARKET

Traditional markets used to be situated in the community center and metropolitan transportation hubs, which facilitate residents' daily food purchasing and food transport from the countryside. They are not only the magnet in the urban residential area, but also a link between city center and suburban farmland. Nowadays, however, with the rapid development of the city, Shanghai's urban centers are becoming increasingly dense. The city needs more land for construction, and the urban boundaries are constantly extended outside. As a result, the suburban farmland that provides food for the city center degenerates, making the transportation distance from the farmland to markets in the city center longer. Moreover, markets in the center of Shanghai city, on one hand, are shrinking because of the urban usable land decrease, on the other hand, the improvement of people's well-being increases their requirement for the shopping environment. More people like to purchase daily food in the modern supermarket instead of dirty and messy traditional food market. Old market in the center of the city was demolished, facing the danger of decline. However, the traditional market is an important public space in the community. Moreover, they are the records of local history and culture and space evolution. In this project, the designer explores the relationship between urban food selling and production space through a hybrid of traditional market, agriculture and metropolitan traffic system in the complex temporary city background. It is in order to strengthen the market space and farmland in the metropolitan area, and serve the urban residents better.

CHAPTER I

MARKET MEMORY

Historical Development and Evolution of Chinese Market Space

Chinese bazaars have formed since ancient times. In Neolithic time, ancestors lived productive lives in groups. In order to facilitate production and security of life, it was necessary to adopt the form of settlement, which several buildings are combined. During the patrilineal clan period, it appeared commercial activities in form of exchange goods. Inter-clan exchange must have a specific place to accommodate transactions, presumably an open square or an outer space in the centre of the settlement, which served the whole tribe. In the primitive period, a simple act of “bartering” was mainly carried out, which can only be considered as the prototype of the market, a bazaar of “trade and remove”.

As agriculture and handicrafts were more developed in the Western Zhou Dynasty than in the Shang Dynasty (1600 B.C. -280 B.C.), commerce became an indispensable sector of the social economy, when merchants were mainly government officials who exchanged a wide variety of goods and circulated them over a wide area. Commodities are exchanged on a daily basis, and money is widely circulated as a means of exchange. In order to meet the needs of slave owners and nobles for the exchange of goods, there were fixed centralized markets in the cities of the Western Zhou Dynasty. “The Rites of Zhou” records three types of market at that time. Firstly, it is the market called “Large Market”, located in the center of a commercial area with workshops and wealth, with business hours starting at noon; Secondly, it’s “Morning Market”, located in commercial area and faced east, with business hours in the early morning; Thirdly, the “Evening market”, an area for small traders, located in the west of the city, with business hours in the evening. With regard to market planning, “The market is behind the palace” in the official book called “The Artisan” defines its location. Considering from the nature of the capital in Zhou Dynasty, it is a castle and its economic function is not significant. Since the planning of the capital highlights above all its political character, the market is merely a service for the royal and subordinate to it. “Guangzi - little Kuang” has recorded that “ If the business operates somewhere, there must have market”, indicating that the Spring and Autumn period has a concentration of market square. Before the Spring and Autumn period, the city’s handicraft industry mainly served the ruling class, but commerce had not yet been fully developed, as a city that played a role in economic life, from the late Spring and Autumn period to the middle of the Warring States period, with the establishment of feudal land ownership and the development of handicraft and commerce.

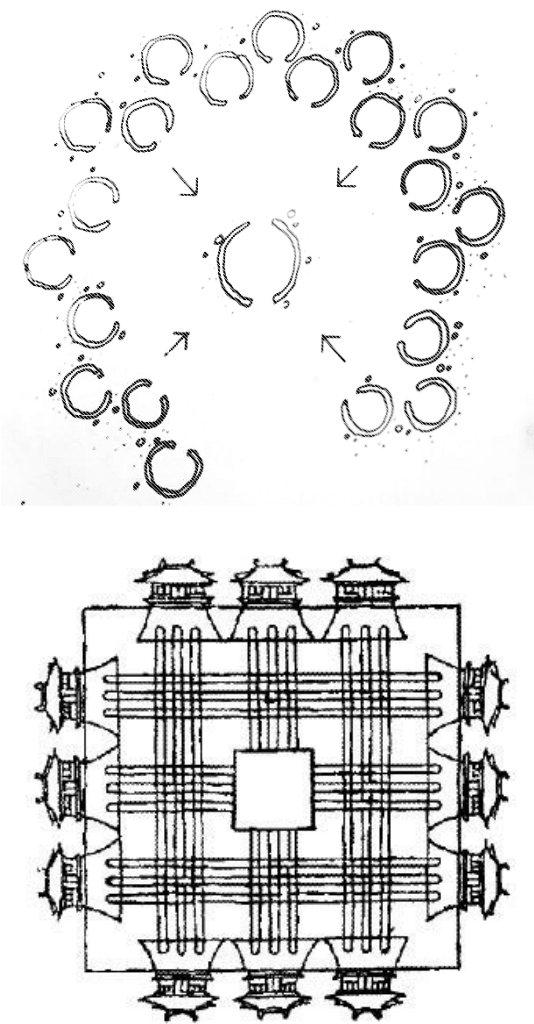


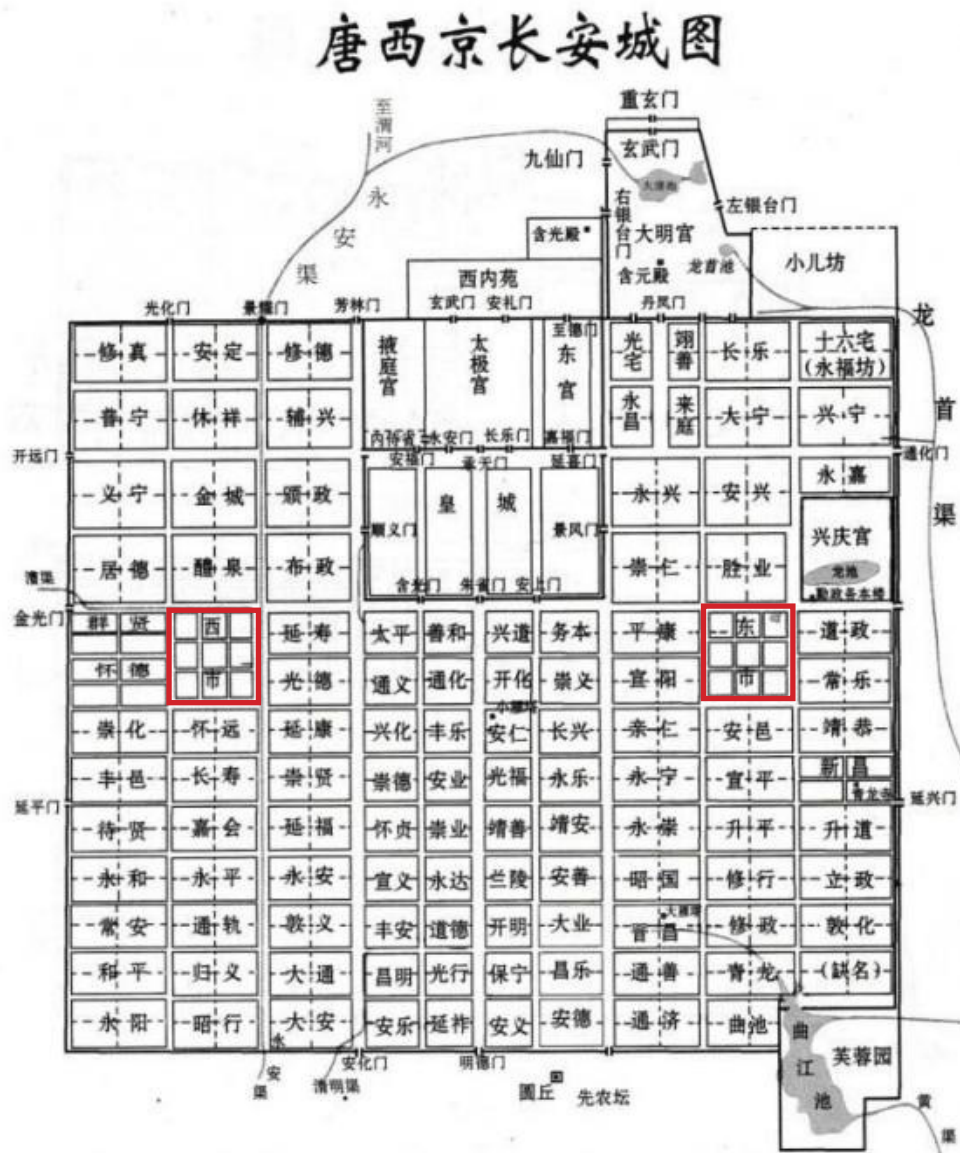
Figure 1 Neolithic homes arranged around marketable squares. Available at: Xi'an Half Slope, Xi'an Half Slope Museum.

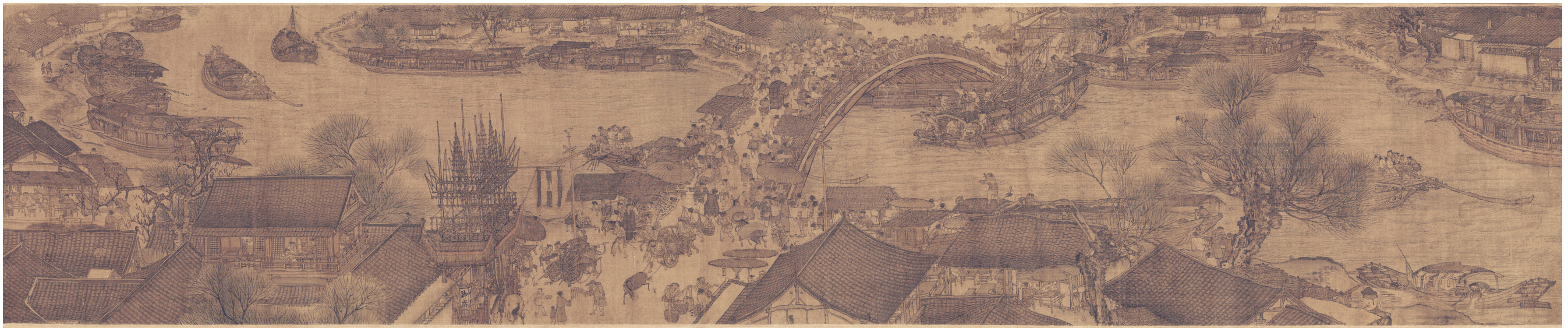
Figure 2 The urban planning of capital in Zhou Dynasty. Available at: <http://www.huaxia.com/ly/fsmq/dl/2010/05/1892435.html>

During the Western and Eastern Han Dynasties, the widespread use of iron tools improved the productivity of agriculture, handicrafts and other industries. However, the socio-economic recovery and improvement of the society damaged by the war since the rapid end of the Qin Dynasty. Cities from the Han to the Tang Dynasties adopted the “Walled District System” as the basic block unit. There were walls and gates around the district and crossing roads inside. The central part of the district is the Municipal Peace Bureau. In “San Fu Huang Tu”, it is recorded: “Bazaars in Chang’an mainly concentrated in the northwest corner of the city. The east and west bazaars are both surrounded by walls of 5 to 6 meters in width, with two roads, east-west and north-south, forming a nine squares layout. The western market was the gathering place for foreign trade at that time; the eastern market had one hundred and twenty rows of various shops. In addition to trading, the market is also a place of public display for the convicts. The commercial activities in the markets are limited by market walls with gates and towers. In some cases, as the variety of trade commodities increased, streets were formed in which the various lines were clustered, and officials were placed in charge.

Chang’an in Tang Dynasty takes up about the area of two squares,

Figure 3 The urban planning of Changan in Tang Dynasty. Available at: <https://baike.baidu.com/tashuo/.browse/content?id=287cbd9a625479aeaaf470c4&fr=vipping>





The city named Dongjing in the Northern Song Dynasty was a breakthrough in opening up the market space of the ancient Chinese capital city, which has undergone a historic transformation of the city's form and civic life, greatly enriching the city's commercial activities and making the city's urban life full of vitality and vitality, just like the modern market. Streets rise to become the most important spatial vehicle for the new commercial order in the city. The market is a combination of the street and the bazaars along it, and the city becomes the place where the thriving masses live.

The scenes depicted in the drawing, "Shi Quben's Riverside Scene at Qingming Festival", are mainly located in the area from gate to Hongqiao at the southeastern end of the Bian River in

Dongjing, where the stalls floating on the river, bridge and along the river are typical commercial spaces. The market buildings' facades in the painting is continuously open to the streets. The transparency and permeability of the ground floor interface attracts pedestrians to stay, and the diverse mix of functions of the market space not only enhances the identifiability of the roads, but also strengthens the connection between the buildings along the streets. The main functional types of markets in the city are commercial, residential and mixed both, and the diverse building functions along the streets allows the markets to form a rich spatial interface. In addition to the openness of the building itself, the signage embodied in the signage, fronts and other decora-

tions attached to the commercial building also adds commercial vitality to the market space. Influenced by the open market, the street space of Dongjing was transformed from a single traffic function to a composition of traffic, shop-invested and transition. Here the traffic space refers to the space for pedestrians, carriages, etc.; Shop-invading space refers to the market furniture such as temporary houses, stalls, tables and chairs erected by shopkeepers, which can easily produce the boundary effect of pedestrian activities and become the external continuation of indoor commercial space; Transitional space refers to the market space for people attracted by commercial acts to stop and stay.

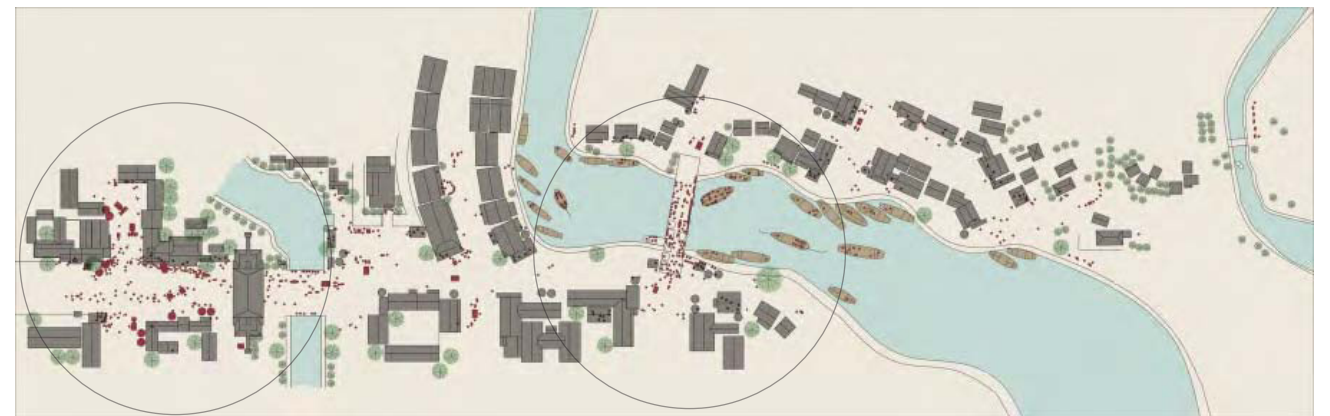


Figure 4 The street market in "Shi Quben's Riverside Scene at Qingming Festival"

Figure 5 The Hong Bridge in "Shi Quben's Riverside Scene at Qingming Festival"

Figure 6 The layout of "Shi Quben's Riverside Scene at Qingming Festival"

Historical Development and Evolution of Shanghai’s Market Space

During the Ming and Qing Dynasties, Shanghai is still a coastal countryside in the south of the Yangtze River, which have narrow streets and lanes crowded with shops. The shops sold all kinds of food,such as meat, rice, fish, duck and chicken. A lot of roads in the southern part of the old town even named after the goods,like Salted Melon Lane and Ham Lane. Outside the city walls, from the east gate directly to the south pier, the river bank were occupied with ports and warehouses,the commercial activities here were even more prosper than inside the old city.

In 1864, as Shanghi opened ports to the foreigners, the population increased rapidly, which required more food to feed the city. At that time, two foreign landmans, priest Lara Boldney and Hanbury ritualued to the French concession bureau to carry out application, which aimed to build a vegetable market by their own money. They asked the bureau to move all temporary stalls into the market. According to the terms, they can run the market in 10 years. After that, the municipal would withdraw the market without payment, and two businessmen could reduce the tax.

Seeing that it was profitable, the Board decided to approve their application and informed vegetable, fruit and game vendors that, since 1 January 1865, they would have to sell their goods in the central vegetable market and would not be allowed to set up stalls. The market, named Central Vegetable Market aptly, was a complete failure: the vendors refused to go there. Less than a month after opening, Hanbury asked to be released from the contract; He thought it would be more profitable to lease the market to a casino tax collector named Lu Yuanan, so he simply did not want to try any further. The public board at first disagreed with the cancellation of the contract, but eventually understood that they would not have a better outcome than Henbury, and the diaspora complained that the cancellation of the original bazaar was inconvenient. Thus, on April 10, the Public Board decided to move the original market back to Public Board Square. This is the first vegetable market in Shanghai - the “Central Vegetable Market” in the French Concession Street (now Ninghai East Road). Although it was just a large shed built on an empty area, it was built in accordance with the municipal management model of modern Western cities. The first food market that emerged in the public foreign concessions were a “street market” literally.

Later, Yang Zijing, a rich businessman, donated a piece of land called “East Wilderness Field” in Wofu Lane, Nanjing Road, and used wooden blocks and bamboo sticks to build a very simple market, let the vegetable vendors set up stalls in the shed free of charge, so the emergence of the first vegetable market in the British concession vegetable market stalls centralized to facilitate the surrounding densely populated citizens, but also provide a better operation environment the traders.



Figure 7.8.9.10 Commercial scenes on the streets in Qing Dynasty. Xiang Chunge. "The prototype of Shanghai market", Available at: <https://baike.baidu.com/tashuo/browse/content?id=287cbd9a625479aeaaf470c4&fr=vipping>
Figure 11 Shanghai’s urban layout in Qing Dynasty. Zhou, Z. et al. (1999) Shanghai Historical Maps Collection. Shanghai People’s Press.



When it comes to public market buildings construction it was after 1891. In 1892, the Hongkou Food Market was completed; in 1893, the public slaughterhouse was completed; and in 1898, the Chinese Food Market (also known as the Training Hall and Public Food Market) was completed. This decade was basically an era of building and rebuilding.

In the Customs Decade Report (1892 - 1901), it is mentioned that “The inhabitants, living in the public rented sector and taking advantage of the opportunity to move forward in the European civilized way, have gradually enjoyed a higher standard of living”, referring not only to the fact that the number of houses inhabited has increased faster than the population, but also to the fact that the indispensable elements of urban life are available here. Some of the elements that are integral to the economic development of the city are just emerging in Western countries and can be found immediately in Shanghai, such as the post office, public grocery store, photo studio, etc. It is in this context that the establishment of modern vegetable farms has emerged, with the development of various facilities and functions in the city. The vegetable market is distributed from east to west and from south to north as the rental sector expands. It is related to the density of the city’s residential population, where crowds gathered and demand increased, it could promote its development, trading prosperity, business day by day; Conversely, other places, where development was hindered, no one rented stalls, eventually closed.

The modern Shanghai food market has undergone an evolutionary process of continuous development and improvement. The increasing number of vegetable markets and the expanding coverage are the symbols of Shanghai’s development. One outstanding case is The Training Hall and the Public Food Market. The cluster consists of two buildings and three parts, are located on the street of Nanjing Road. Behind it, between Guangxi Road and Guizhou Road, is the China Vegetable Market, the first all-steel frame building. On the ground floor of the training hall is a vegetable market for foreigners with 33 stalls, and on the upper floor is a drill hall measuring 157 x 80 feet, with smaller rooms for the personnel of the Universal Business Corps. The drill hall provides a venue for convening public meetings and important social gatherings. The Chinese food market in the background is a two-storey building with an all-steel frame structure, the floor and ceiling supported by cast steel columns, and the floor slab paved with concrete on steel beams and small beams. In the center of the roof is a steel-framed glass octagonal dome, diagonal up to 40 feet. The steel staircase is chic and can be accessed by four people in parallel. The steel structure, weighing 575 tons, was supplied by Whitefield of London, UK, with concrete poured on the ground floor and wrought steel balustrades around the ground and first floors, 6 feet to 7 feet high. The entire building can accommodate 446 stalls. The Department of Public Works described the building as “the most ambitious project ever built, and the design scheme is a great success from any perspective”.

Another famous market is called the Hongkou Triangle Market. Built in 1892, it has civilized Shanghai with its location and the number of transactions, making it a true “centralized vegetable market”. It was the earliest and largest market with the highest taxes at that time. “Triangle” has thus become a famous brand that remains in the history books of Shanghai, in the memory of Shanghai people. The market was named triangle for the reason that it was built on a triangle land, where

three roads intersect: Hanbili Road (present-day Hanyang Road), Peng Road (also known as Wenjun Shi Road, present-day Tanggu Road) and Miller Road (present-day Emei Road). Hanbury, the property owner at the time, suggested that the facade of triangle market should be to the streets and that there should be no walls without doors and windows. In order to manage the market and facilitate the trade of vendors and customers, in 1892, the Bureau of the Ministry of Industry built a large wooden indoor vegetable market here, with a gas building on the roof and guttering on the ground, becoming the earliest and largest indoor vegetable market in Shanghai at that time. The market opened on 1 June 1893 with stalls for hire and tax and management fees for goods entering the market.

From January 1913 to September 1914, the original wooden building was demolished and rebuilt into a two-story (and partly three-story) reinforced concrete structure, nearly doubling its volume. The ground floor is mainly a vegetable market; the second floor sells fish and meat, as well as canned and packaged food and other agricultural products; the third floor is a snack shop. In order to provide enough natural light to the market on the ground floor, the middle part of the market was designed with a large canopy, from which the light came straight down, making it look spacious and bright. The rebuilt market is a model for early indoor markets in Shanghai. After the renovation, not only Chinese vendors rented more stalls, but even foreigners have applied for stalls in the Hongkou Market.

Figure 12,13 The Hongkou Triangle Market, 1892. Tang Yanxiang and Zhe Xiaoqi (2008) Shanghai Restaurant and Market in Modern Time. Shanghai: Shanghai Dictionary Press.

Figure 14 The Hongkou Triangle Market after rebuilding, 1913. Tang Yanxiang and Zhe Xiaoqi (2008) Shanghai Restaurant and Market in Modern Time. Shanghai: Shanghai Dictionary Press.

Figure 15 Indoor of New Hongkou Market, 1913. Tang Yanxiang and Zhe Xiaoqi (2008) Shanghai Restaurant and Market in Modern Time. Shanghai: Shanghai Dictionary Press.



As time goes by, at the beginning of the 20th century, there were seven markets in the public tenancy: China, Hongkou, Ayr near, Huishan, Donghongkou, Press and Maho. This was the first food market built by the Department of Industry. The “Shanghai Guidebook” typographically printed in 1916 lists 27 vegetable markets, including Huajie and the concession: Ximen Road Hongqiao, Xiaodongmen Inner City God Temple West, Dadongmen Outer Langjia Bridge, West Gate Outside Wansheng Bridge, South Gate Waishui Shenge, Mongol Road (manchurian intersection), Bingchangqiao Road, Yanxu Mountain Villa diagonally across, Baoshan Road, Dongheng Road, Yipinliqian, Qiujiang Bridge, Jiujiang Road (Guizhou intersection), Tianjin Road, Peng Road (commonly known as triangle) Diwusong Road, Hanbili Road corner), Aier near Luzhong City (Qingxianglikou), East Youheng Road (Xinji East), Tilan Bridge (Zhoushan Intersection), Aiwenyi Road (ie Chenjiabang), Xiaodongmenwai Street, Dagu Road (Maho Road West), Baxian Bridge, Caishi Street (ie Ningxing Street), Anjin Road, Yangshupu Road (Yangshupu Bridge East), Yangshupu Road (near Taihe Street), Wuzhou Road (North of East Yalu Road), Wuzhen Road, Baoxing Road, Gonghe Road.

From the addresses of these markets, it can be seen that the number of markets in Chinese concession at that time also grew to nearly ten. The purpose of the establishment of them is to establish one of the largest markets in each district, where appropriate. Several smaller markets have been established at the site. A number of smaller vegetable farms were established with the aim of bringing all street vendors selling fresh food into the public sector. In line with this municipal philosophy, and with a good annual income in return, the 1930s saw a significant increase in the number of vegetable farms as rental housing grew and densely populated areas demanded that all kinds of food be purchased close by. By 1935, the annual report showed that

there were 17 vegetable farms set up by the Bureau of the Ministry of Industry in the public tenure area, eight in the East, four in the North, two in the Central and three in the West. This does not include private vegetable farms. At that time, a number of vegetable farms in Shanghai were built using advanced reinforced concrete structures, some also used beamless floors for better space and light, the appearance of a more simple, without any decoration.

According to the original intention of the Bureau of Industry, it can be seen from the table above that in the 1930s, there was a lack of a large scale market in the Western District, so it was mentioned in the annual report of the Bureau of Industry that there was an urgent need for a large vegetable farm in the Western District, including food for foreigners, in order to meet the needs of the growing foreign population. On July 21, 1932, a new news station on Shanghuang Road replaced the old news station on Ai Wenyi Road (now Beijing West Road). With its opening, the West End has a larger-scale vegetable market. In January of the same year, in May, the Beijing Road and Liaoyang Road vegetable farms opened. The three vegetable farms mentioned above are all relatively new in style, with the ground level inside the farms being laid out according to the new method, i.e. the pavement level is high and the ground level where the foundation is pushed is low. This keeps people's clothes from getting wet while they are shopping. And the road is quite wide and comfortable. Some markets, such as the Fuzhou Road Market, are equipped with an elevator because of the convenience and popularity of its use among residents, which will become a standard for future improvements in market construction. As the public was accustomed to using elevators, the establishment of upstairs market in the future would greatly reduce land use in the city center.

Figure 16 The Fuzhou Road Market. Tang Yanxiang and Zhe Xiaoqi (2008) Shanghai Restaurant and Market in Modern Time. Shanghai: Shanghai Dictionary Press.

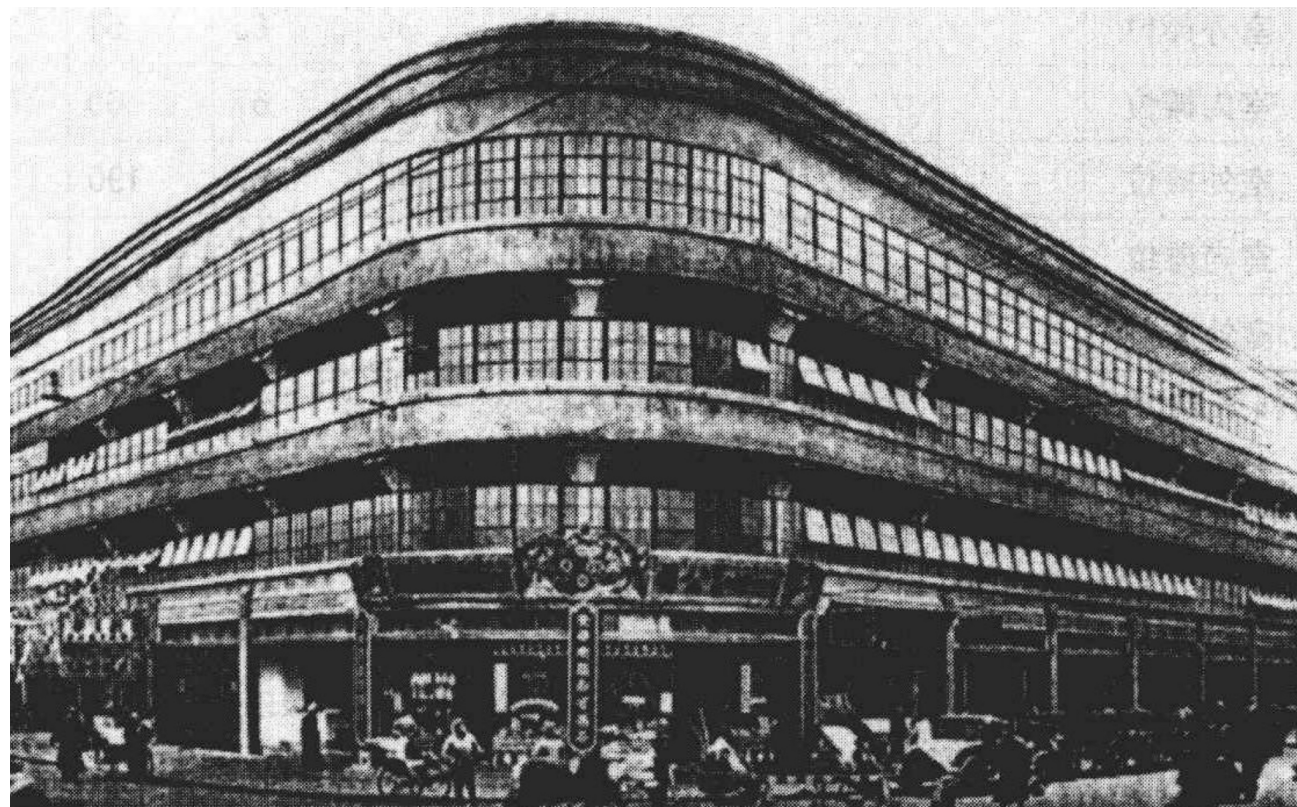


Figure 17 A Japanese woman bought food in The Hongkou Triangle Market during World War II. Tang Yanxiang and Zhe Xiaoqi (2008) Shanghai Restaurant and Market in Modern Time. Shanghai: Shanghai Dictionary Press.

In the early days of the Anti-Japanese War, the operation of the vegetable farm was slightly affected, mainly due to the lack of supply. In the latter half of 1938, most of them returned to their normal state. The trading of various vegetable farms in the Central and Western District was still very prosperous and continues to be the center of the vegetable farm industry in the industry. Hongkou Vegetable Market was the best place for the business of North District Vegetable Market. Most markets were occupied by Japanese. “There are only Japanese overseas investors. Most of the trade in the Hongkou market is still managed by Japanese overseas investors.” In January 1939, the Hongkou market had returned to its pre-war glory.

After the outbreak of the Pacific War in December 1941, the Hongkou market was occupied by the Japanese army and was called “Mai Gai Island” (that is, a transliteration of the English market). After the victory of the Anti-Japanese War, the Health

Bureau often sent staffs to inspect the 24 markets in the city, urging the market to keep it tidy, selling items to be inspected at any time to meet hygienic requirements. All items that did not conform to market rules, such as snack shops and grocery stores, were banned. It also stipulates the principle of one person, one row, and it is not allowed to occupy the venue and take over concessions. The city has set up stalls, and 353 places have been determined through investigation and survey. Representatives of the municipal public utility bureau and other representatives are invited to discuss and decide on two points: Firstly, it is regulated that each stall base was four feet long and three feet wide. Secondly, the two districts of Huangpu and Laozha were not allowed to set up stalls during the day; the impassable roads and lanes were allowed to set up stalls on the principle of not obstructing traffic, city appearance, and fire protection; but must obtain the consent of the households.

Figure 18 Shanghai Markets Map, 1930.

Table 1 Shanghai Markets Recorded,Public Foreign Concession, 1930.Tang Yanxiang and Zhe Xiaoqi (2008) Shanghai Restaurant and Market in Modern Time. Shanghai: Shanghai Dictionary Press.

District	Name	Built Year	Area(Mu)	Building type
East District	Huishan Market	1905	2.022	old-style building
	East Hongkou Market	1935	Unknown	Two-storey reinforced concrete building
	Yangshupu Road Market	1910		Two-storey reinforced concrete building
	Wuzhou Road Market	1916	0.818	old-style building
	Songpan Road Market	1923	1.428	one-storey reinforced concrete building
	Qiqihaer Road Market	1926	2.328	old-style woodenbuild-ing
	Pingliang Road Market	1928	2.332	one-storey reinforced concrete building
North District	Liaoyang Road Market		2.4	Two-storey reinforced concrete building
	Hongkou Road Market	1892	Unknown	one-storey reinforced concrete building
	Aierjing Road Market	1905	9.939	old-style woodenbuild-ing
	Bodun Road Market	1917	3.171	
Middle District	North Fujian Road Market	1924	1.428	Two-storey reinforced concrete building
	Fuzhou Road Market	1930	2.277	Two-storey reinforced concrete building
	Beijing Road Market		4.107	
West District	Mahuo Road Market	1905	1.878	Two-storey reinforced concrete building
	Xinzha Road Market	1905	2.665	Three-storey reinforced concrete building
	Xiaoshadu Market		Unknown	



In 1947, houses in various markets across the city were in poor condition for many years, manifested in: rotting water pipes, clogged gutters, leaking roofs, toilet dumping and urgent repairs. After appraising the investment, the municipal government repaired them according to their priorities. There are six private markets in the public concession in the 1930s, and the Western District occupies four locations: namely, the Hatong Market of Annan Road, the Shengping (transliteration) Market of Seymour Road, the Shamon Market of Datong Road and the Xinzha Road. Dashun market. The management of private markets is unsatisfactory and

difficult. As of the eve of Shanghai’s liberation, there were 22 municipal indoor markets, 9 private indoor food markets in the urban area, as well as a large number of road markets and unauthorized bazaars, totaling more than 200. In the 1960s and 1970s, the number of Shanghai central market stabilized at around 150, with more than 500 supply outlets. In order to facilitate the supply of the non-staple food market and regulate the economy, the urban companies in the 1970s have begun to prepare small cold storages for vegetable markets, equipped with motorized freight vehicles. After the 1980s, with the recovery and devel-

opment of market fairs, the establishment of the educated youth market, a number of agricultural markets appeared later, and the model of a single plan channel for vegetable and grocery retail was broken. The pattern of supply is formed. By 1990, including new construction, reconstruction, and planning ones, the city had 224 independent markets, 15 Chinese operating markets, and 511 supply outlets. There are 67 markets undergoing transformation, 37 markets including Northern Shaanxi and Baxianqiao have become shopping malls, commodity packaging, modernization of equipment, elec-

tronic measurement, operation of “big non-staple food” (increasing the operation of sugar and wine canned goods, etc.) and full-time The supply of novel grocery stores. Some are also opening “optional shopping mall “communities on the premises; there are 30 road vegetable farms that can either enter the interior or be transformed into a kiosk market. Various facilities in the market are further supported and the supply of commodities is abundant.

Chapter II

Food Architecture in Shanghai

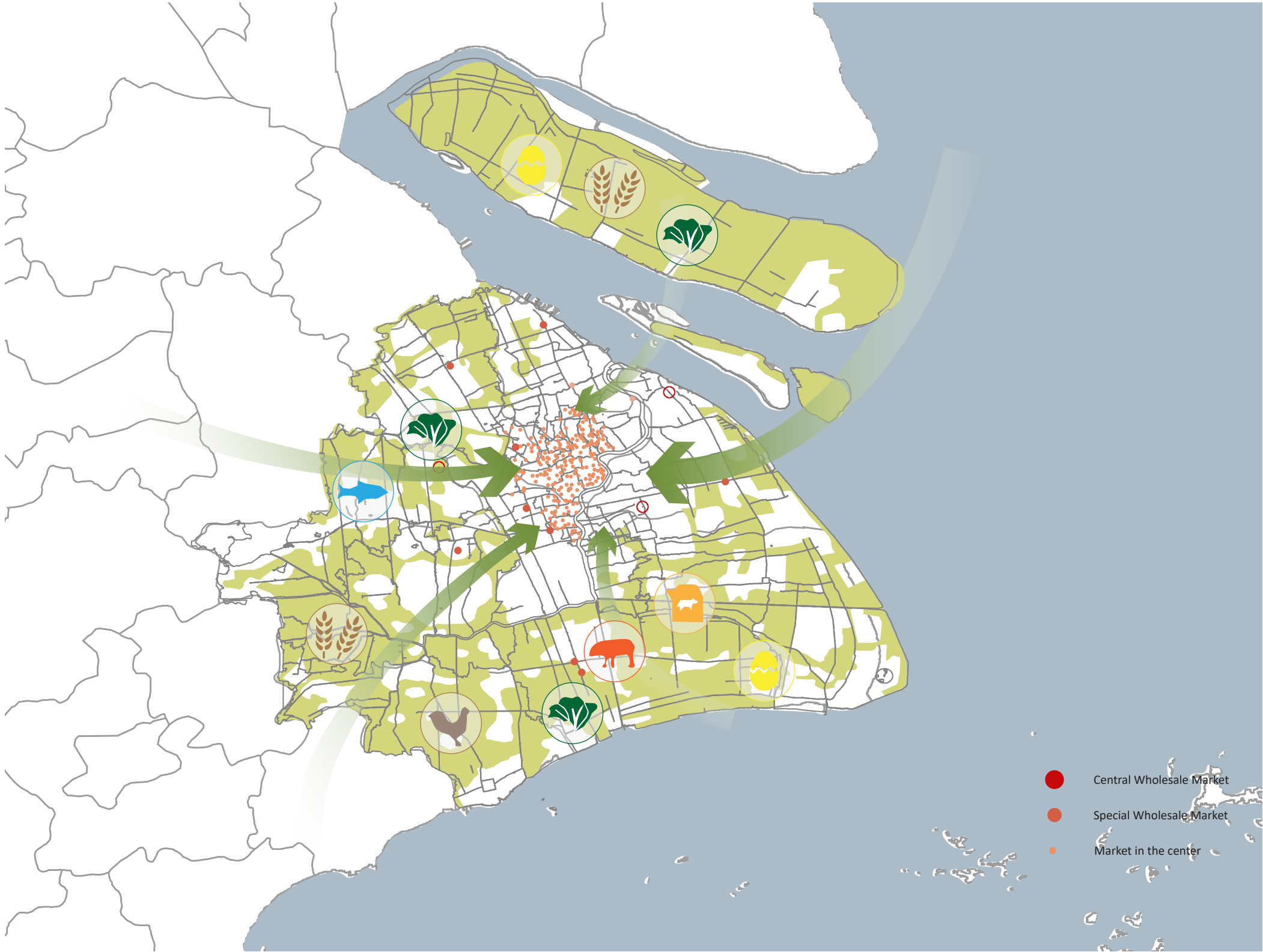
Map of Agriculture and Market

Shanghai has a high localization rate of vegetables and dairy products in food, while other fruits, meat and aquatic products are mostly imported from other cities. Urban agriculture area is mainly divided into peri-urban part and far-urban part. The peri-urban area is located in the periphery of the central city, about 15km-20km away from the city center, the area is highly urbanized, farmland is distributed between the built-up area or embedded in the built-up area, there are more small group farmland and scattered plots, most of the area has a settlement index of less than 20%, agricultural production land accounts for about 15% of the suburban area, mainly including Minhang District, southern Baoshan District, eastern Jiading District, northern Pudong District, Qingpu District and Songjiang District. This area serves as a buffer zone for the city of Shanghai, where much of the agricultural land is protected, not only to curb the sprawl of the central city, but also to improve the ecological environment of the city. Suburban agricultural production is dominated by a combination of vegetable, fruit and rice; far-suburban agriculture area is about 30km-50km away from the city center. It is the main producing area of Shanghai's agricultural products, including Chongming, Changxing and Yokosha islands, as well as the middle-east Jinshan district, Songjiang, Punan, Fengxian and Pudong South areas on the north coast of Hangzhou Bay. Agricultural land is relatively large and produces a rich variety of agricultural products, focusing on the development of vegetables, fruits, poultry, dairy and aquaculture.

There are more than 700 existing vegetable markets in Shanghai and about 228 in the city city centre. Most food produced on the outskirts of the city are sold through small farmers to large wholesale markets on the edge of the city's central circle. Then the market stallholders im-

port food from the wholesale markets and sell in in the city center.

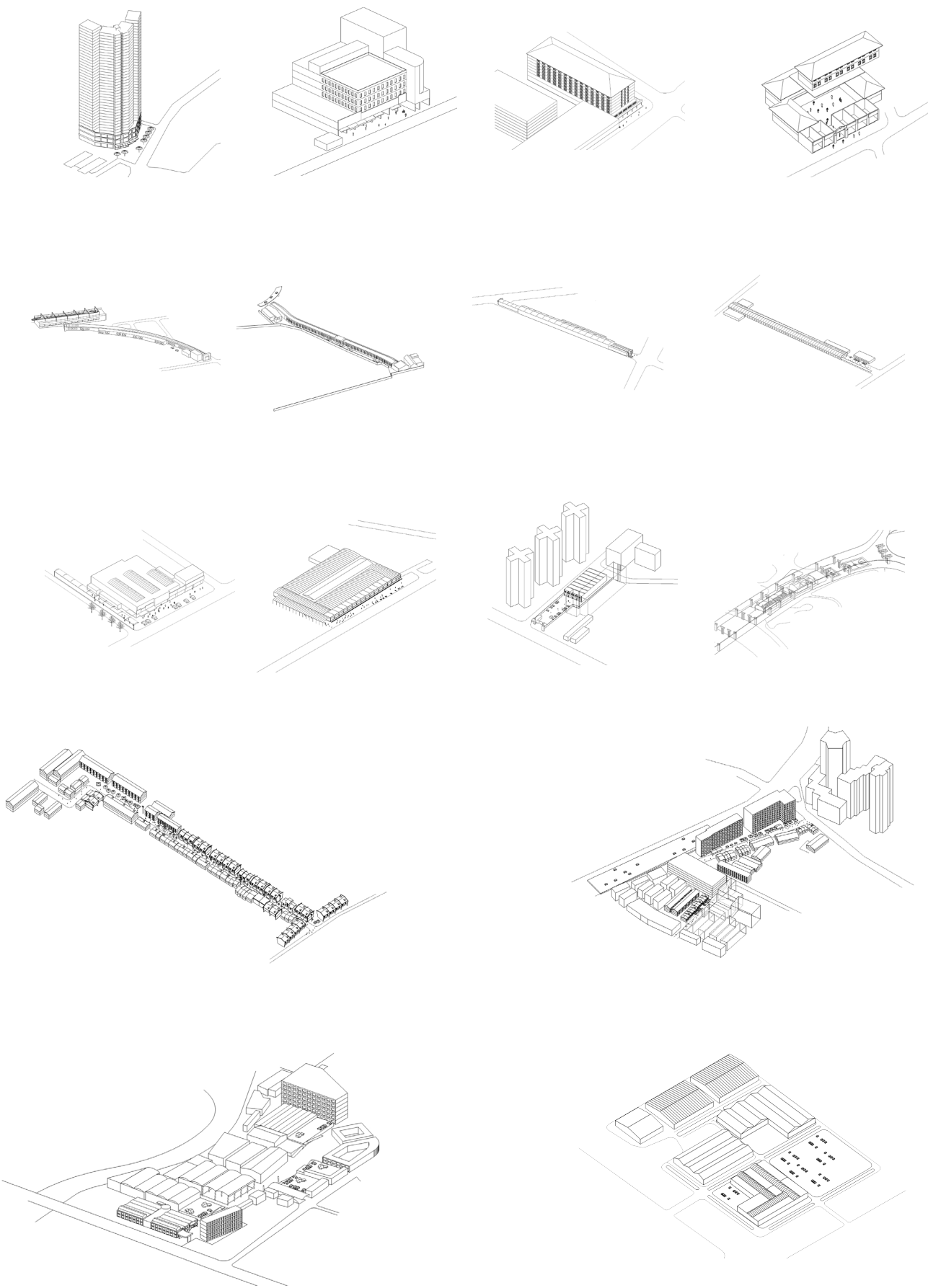
Figure 19 Shanghai Map of Agirculture and Market, 2020



Typology of Shanghai market

Today, we still can see that some large food markets left over from the history and newly built standardized wet markets in the center of Shanghai. These markets have different architectural typology, which can be summarized into the following five categories:

- Subsidiary
- Continuous
- Large scale centralized
- Distributed
- Movable



Typology of Shanghai market——Subsidiary Market

Definition: Refers to a vegetable market attached to a part of buildings with other functions. It is predominantly occupied the ground floor and underground spaces of the buildings.

Emergence time: After the 21st century, with the dense development of Shanghai's central city and soaring land prices, the single-storey market building was no longer suitable for the compact urban space in the city centre and was demolished, replacing them with small, attached indoor markets. This market is also a major market type for other high-density cities in East Asia, such as Taipei, Hong Kong, Tokyo, and Singapore.

Location: Small subsidiary markets are densely packed into the city centre, with a distance of around 500m between each other. The markets and other supermarket chains and fresh stores form a dense food pervision network in the central city. Apart from this, it is also rarely distributed in the peri-urban areas.

Surrounding environment: The years of construction and the urban fabric of the buildings around the annexed market are very diverse. The surrounding buildings, such as the Taikang Road Market in Tin Tsz Fong, were built in the 1930s. It is a collection of historical buildings of all types from the countryside to the rented sector to the modern urban development of Shanghai, which are multi-storey buildings with dense urban fabric, making it an important historical district in the city. But in the case of Wuding Road Market in Caojiadu, it is located in the middle of a residential area, and most of the homes here were built after the 21st century, and the building types are towering high-rise, up to 29 stories, with large distances between buildings. The urban form of the annexed market is not very prominent. It is generally surrounded by very well-developed businesses and a good urban infrastructure. For example, Taikang Road Market is surrounded by famous city tourist attractions, bars, art museums, large shopping malls and so on. So subsidiary markets are not very prominent in terms of commercial influence on the periphery.

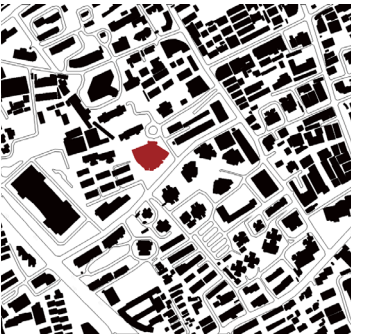
Auxiliary facilities: These small markets generally have only one or two entrances for external services, are about 4m wide and have no exclusive underground parking and refrigeration rooms.

Architectural features: The market generally covers a small area, around 500-1500 m^2 . The variety and number of stalls are less than the large centralized ones and mainly serve the neighborhood to buy daily food. According to the functional classification of the upper floors of the buildings, the subsidiarymarkets can be divided into two main categories: mixed-use buildings attached and residential buildings attached. Because it is located on the ground floor or in the basement of the building, the interior space of the subsidiary type is limited in height, mostly around 5m, and there is hardly any window to bring in natural light. The structure of the markets are consistent with the buildings to which it is attached.They are mostly concrete, with some of the vegetable markets attached to the ground floor of earlier older homes being brick mixed structures.

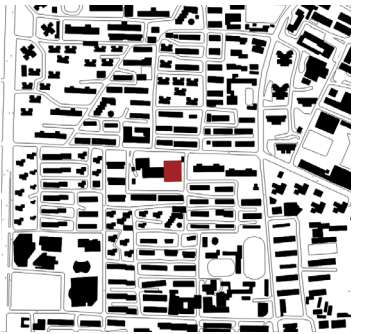
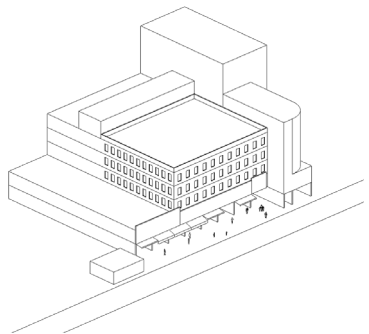
Population served: The demographic composition of Shanghai's central city is complex, with elderly people living in old neighborhoods or migrant workers renting here, and the white-collar elite living in new, upscale neighborhoods. But the timing of their visits to the market is very regular. Older people generally use the early morning exercise time to go to markets before 10 a.m. to buy vegetables, which they can get fresher food at this time. And while most of the white collar class buys their vegetables in the evening, when the stalls sell fresh food are about to close. Other fast food takeaways may just be open.



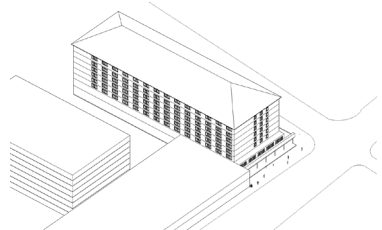
NAME: Wuding Road Market
AREA: 2000 m^2
FUNCTION:
Apartment+Community
Center+Repair Shop+Market



NAME: Quyang Road Market
AREA: 1200 m^2
FUNCTION:
Hotel+Internet Cafe+Market



NAME: Mengxi Road Market
AREA: 1200 m^2
FUNCTION:
Apartment+Barbershop+Supermarket+Market



NAME: Taikang Road Market
AREA: 1000 m^2
FUNCTION:
Apartment+Artstudio+Musicstudio
+Market

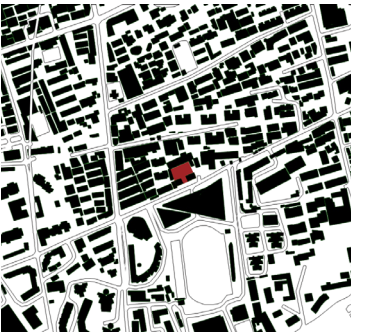
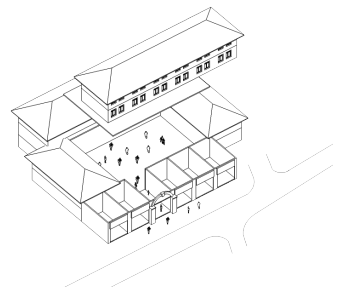




Figure 20 Outside view of Wuding Market. <http://www.dianping.com/shop/k1HvZ4xmTHV2oPrW>



Figure 22 Outside view of Taikang Road Market after renovation. <http://www.dianping.com/shop/k6bmrhV4kOGougmF>



Figure 21 Outdoor Space of Chifeng Road Market. <http://www.dianping.com/shop/k5i6iSVVpCHQu55y>



Figure 23 The indoor space of Wuding Market. <http://www.dianping.com/shop/k1HvZ4xmTHV2oPrW>

Typology of Shanghai market——Large Centralized Market

Definition: A food market where the sales area of all kinds of goods are concentrated in a single building interior space or several interconnected interior spaces.

Emergence time: It is the earliest type of indoor food market building in Shanghai, such as the historical Hongkou and Baxianqiao Market.

Location: Due to the large capacity of the large centralized market, the bad influence of cargo transportation and sanitation on community residents, and the high land prices in the city center, most of the large independent centralized farmers’ markets in the former downtown Shanghai have been relocated to the periphery of the city. A small number of centralized food markets still survive in lost spaces in the city center, such as the Tenmu West food market which is under the viaduct.

Surrounding environment: Residential areas around this type of markets are mostly built after 21st century. The building groups are mostly row type, high in height but low in building density. In terms of the urban fabric, the market, due to its large and concentrated plan, and the fact that the buildings are mostly one or two stories, the height of the building and the graphic plan make it different its form in the community. Centralized markets are mostly found in well-located locations such as urban intersections, by viaducts, subway stations or train stations, and other public transport hubs.

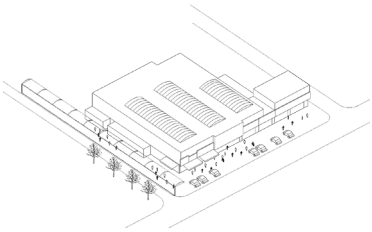
Auxiliary facilities: Most large centralized markets are equipped with large capacity underground parking. Apart from that, for the reason that it is far from the city centre, there are not too many shops around, but the market itself creates a “magnet” effect: all small retail stores are mostly attached to the market. For example, there are various functional commercial service facilities along the street part of Luoshan Road Market, in addition to snack bars, barbershops, Internet cafes, grocery stores, and a small commercial street to its left. Another example is the Canton Market, which is lined with daily necessities stores, clothing stores, grocery stores and even hotels, with a temporary market of mobile vendors below. The entrance to a centralized market building is clearly marked from the outside, and in order not to create internal congestion, there are usually two to four main entrances, which are wider, usually around 8m. Building entrances are often directly connected to city sidewalk streets or parking lots are set up as entrance buffers, with the main body of the market slightly distant from city streets, such as the Fukuyama Road Market.

Architectural features: Generally, the building covers a large area of over 5,000 square meters and has a large number of stalls. In the case of The Canton Market, there are 87 vendors in the Guangdong Road Market, which sells edible agricultural products, daily-use department stores, flowers, birds, fish and insects, as well as related appliances and art crafts. The buildings mostly have single or two storeys, and the interior space is higher than the ordinary small indoor vegetable market, about 6m, and can be equipped with high side windows and introduce skylights, so the light and ventilation conditions are relatively good. Most use single-storey simple light steel structures, while some markets have more than one storey and use reinforced concrete structures.

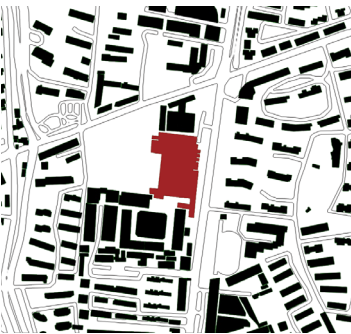
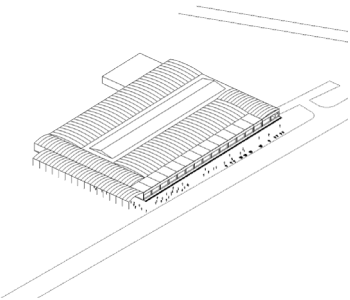
Population served: The communities in which the large centralized markets are located are largely populated by urban outsiders who are younger and usually work during the day and come to the market at the end of the evening to buy food.



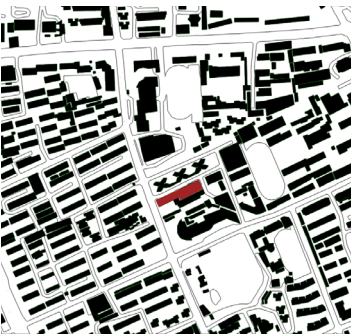
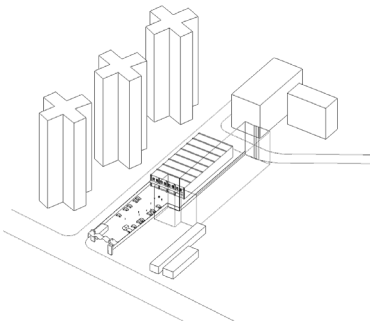
NAME: Luoshan Road Market
AREA: 24000 m²
FUNCTION: Street
Market+Barbershop+Police
office+Supermarket+Internet Cafe



NAME: Guangyue Market
AREA: 8000 m²
FUNCTION: Street Market+Market



NAME: Fushan Market
AREA: 4000 m²
FUNCTION: Market+Photography+Community
Service+Furniture retail



NAME: Tian Muxi Market
AREA: 3000 m²
FUNCTION: Highline+Parking
lot+Table Tennis Room+Basketball
Field+Market

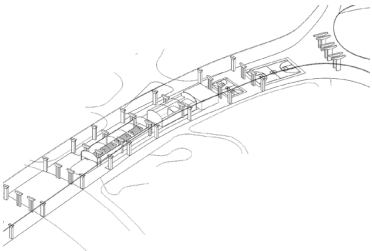




Figure 24 Tian Muxi Market under North and south viaduct. Xiangning Lee, Dangfeng Lee and Jiawei Jiang. (2004) *Made in Shanghai*. Tongji University Press.



Figure 26 Indoor Space of Luoshan Market after renovation. <http://www.dianping.com/shop/k5i6iSVVpCHQu55y>



Figure 25 Indoor Space of Luoshan Market. <http://www.dianping.com/shop/k5i6iSVVpCHQu55y>



Figure 27 The entrance of Guangyue Market. <http://www.dianping.com/shop/G97orqwzoG1dP3ps>

Typology of Shanghai market——Continuous Market

Definition: A market consisting of a number of adjust shops located in separate rooms

Time of emergence: Around the 20th century.

Location: The same as the large centralized market, the continuous market is located at a certain distance from the city center.

Surrounding environment: The formation of many continuous vegetable markets is associated with linear elements in the history of urban development, such as railroads, streets, rivers, elevations, etc. For example, the Cao Yang Railway Market in Putuo District, Shanghai, is located on the “ruins” of the old railway. This railroad came out of Shanghai West Station and was used to transport goods, which slowly became obsolete as it was not used for a long time. Later, a food and grocery market was built on this section of the railway to meet the purchasing needs of residents on both sides of the railway. In the late 1990s, the government built the Jingdong Road vegetable market after building a section of the river in Dichaibang to meet the needs of nearby residents. While some contiguous markets appear in the street between two buildings, with only one market sign to the outside, some contiguous markets traverse an entire block of the city, their slender masses forming a special form in the city.

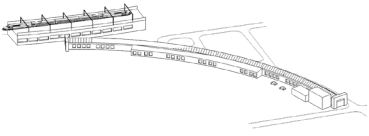
Auxiliary facilities: Large continuous markets usually have parking in front of the entrance , or in another case, parking is arranged along long strips of volume. For example, the path on the west side of Jingdong Market is used as a parking lot and space for the temporary traders, while the two-storey house on the west side of the north side is partly used for the vendors’ accommodation. There is a bathhouse for vendors and a billiards hall recreation room on one side of the Tokang Road Market. There are generally only two building entrances to the market,at the beginning and the end of the continuous market.

Architectural features: Continuous markets vary in length, some reaching over 300 metres, others perhaps as little as 50 metres. Depending on the type of shop opening, continuous shop-type markets can be divided into two categories: outward continuous shop-type markets and inward continuous shop-type markets. Each store in the outward facing continuous store market opens to the outdoor space and each store in the inward facing continuous store market opens to the indoor or semi-outdoor access. The building has a single internal flow. In terms of building structure, the continuous market uses modular masonry shop units. A steel frame and colored steel tiles are used to build the roof with long side windows above the central walkway of the inward-facing continuous shop type vegetable market, which can achieve the effect of natural light and make the central walkway very bright inside. Each shop usually only deals with a certain type of goods in the market, such as vegetables, fruits, spices, etc. These shops together form a vegetable market with a more complete function, managed by a unified market manager, so the continuous shop-type vegetable market has a stronger overall character than ordinary street-level commercial shops.

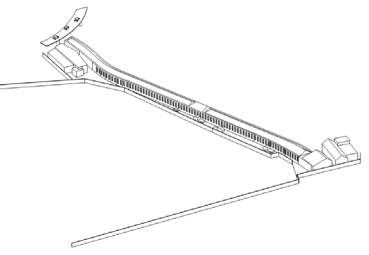
Population served: Similar to large centralized food markets, continuous markets mainly serve migrant population.



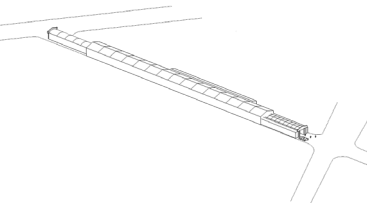
NAME: Hong Zhu Market
LENGTH: 300 m
FUNCTION:
Apartment+Community
Center+Repair Shop+Market



NAME: Jingdong Road Market
LENGTH: 250 m
FUNCTION:
Resident+Bath+Market



NAME: Caoyang Road Market
LENGTH: 250 m
FUNCTION:
Apartment+Barbershop+Supermar
ket+Market



NAME: Dongkang Market
LENGTH: 250 m
FUNCTION: Bath+Billiards+Market+
Supermarket

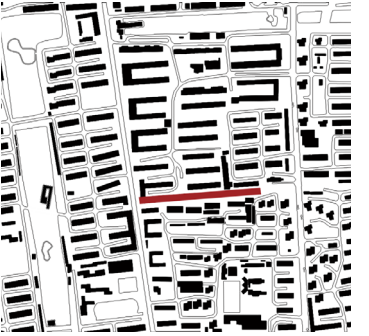
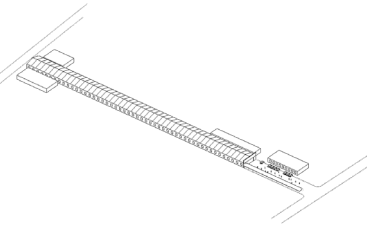




Figure 28 The inside long corridor of Zhujiang Market. Stores are listed on both sides of the aisle. The shop has high windows above.<http://www.dianping.com/shop/k5i6iSVVpCHQu55y>

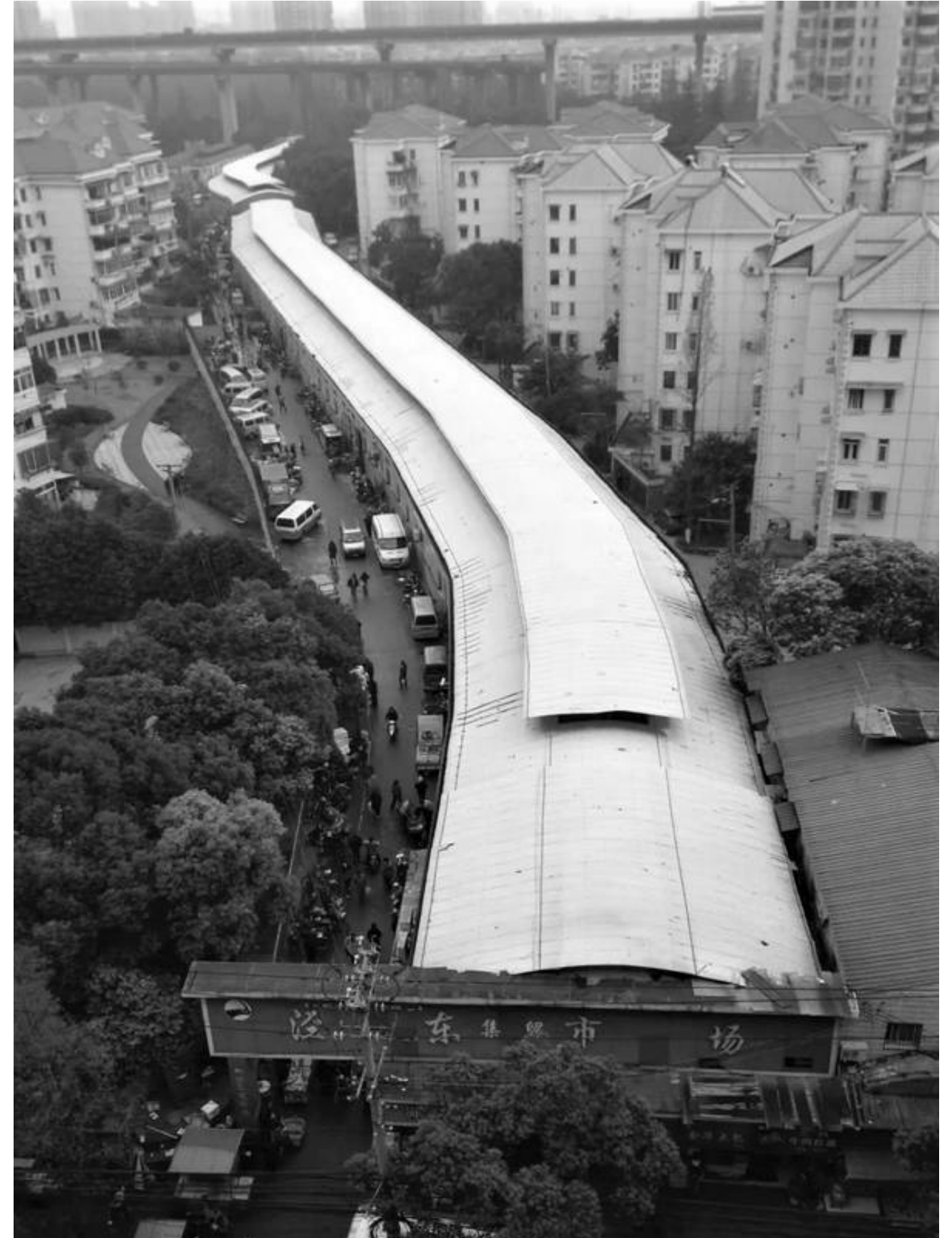


Figure 29 The bird view of Jingdong Road Market. The market went through the entire block.<http://www.dianping.com/shop/k5i6iSVVpCHQu55y>

Movable Market

Definition: A temporary food market where the location of market operations can change over time. As it is usually located on both sides of the road and is also known as a road market.

Time of emergence: Mobile markets are the first form of market in history, whether in Shanghai or other cities. In the infancy of the city, farmers from the surrounding vil-lages took their own surplus food production and sold it in the city. As the city’s economy continues to grow, more and more merchants are coming to the city center to sell food, and the streets of Shanghai’s Old Town are infested with temporary stalls.

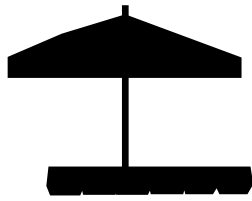
Location: Old downtown or suburban area.

Surrounding environment: Due to the city’s beautification campaign in recent years, most of the mobile stalls have been outlawed and only a portion of the market still exists in the old town. For example, the market at Ham Lane in Huangpu District, Shanghai, was formed in the 19th century. It’s called Ham Lane because most of the shops here used to sell ham in the old time. But with the exception of this small section of the road market that remains, much of the rest disappeared. The surrounding Zixia Road was also originally a street, but is now widened to 45m of Fuxing East Road, with the Cross River Tunnel underneath. The street market here is surrounded by old 19th century neigh-bourhoods, many of which are wrapped up in modern high rises on the periphery, and about 800m from the market is the city’s famous tourist attraction, with the old market hidden in the city’s crevices. Foreign visitors or others apart from locals can hardly find these markets.

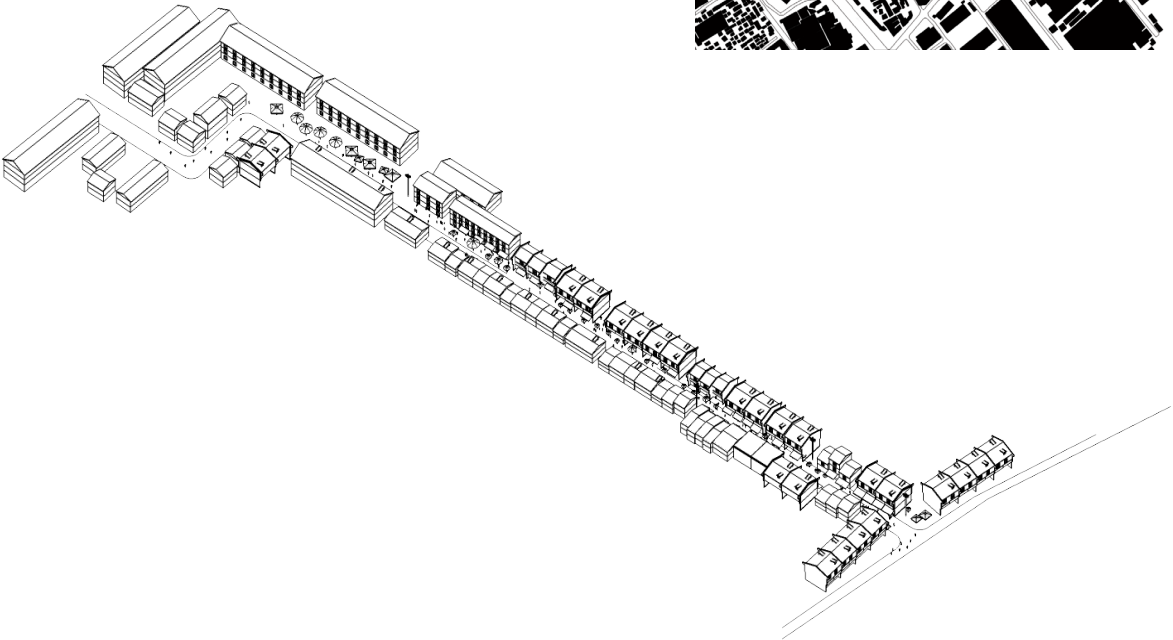
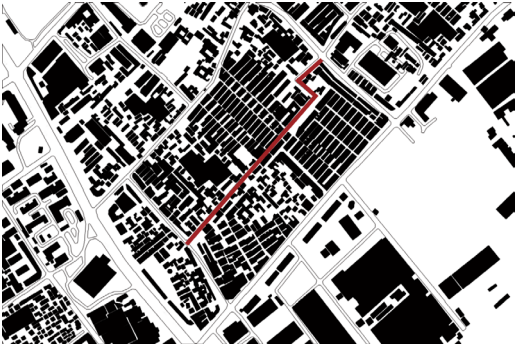
Auxiliary facilities: There is little public facility support for mobile stalls. Most of these stalls are very simple, with food laid directly on the floor, some on simple tables, shelves and boxes, and some using vans or minivans as mobile stalls.

Architectural features: The open-air street market is an important public activity space to stimulate the city’s vitality, combined with the urban space setting. Although it has a negative impact on the environmental sanitation of the residents’ community, and vendors’ stalls can cause congestion in the streets, the combination of a wide variety of goods and commercial facilities, combined with the old buildings with a distinctive flavor of the Old Town, creates a highly identifiable street space that promotes social interac-tion among the residents of the community and facilitates their daily lives.

Population served: The market mostly serves the local residents in the old urban district, especially some of the old Shanghai people who are over 60 years old.



NAME: Zhou Jiazui Street Market
Length: 450 m
FUNCTION: Street Market



NAME: Fushan Market
AREA: 300m
FUNCTION: Street Market

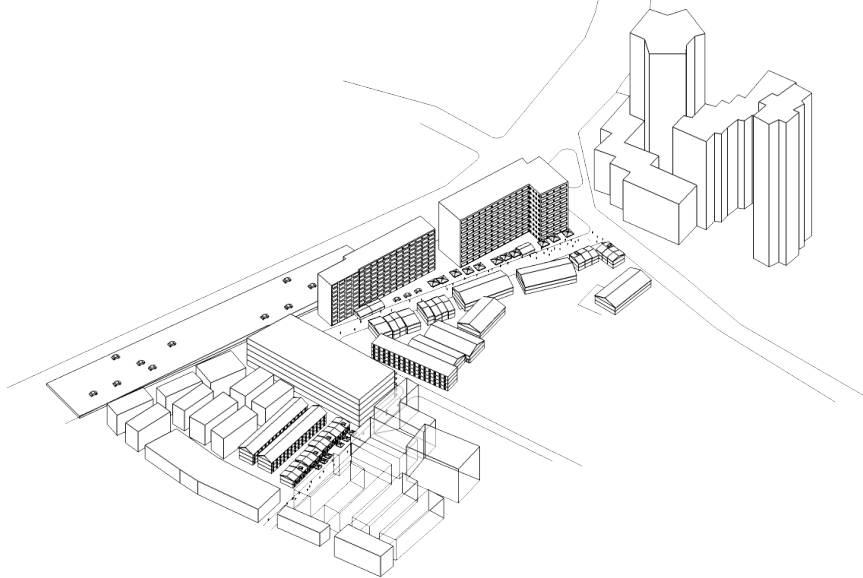
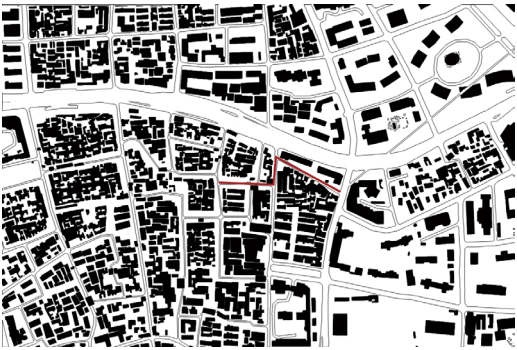




Figure 30 Shanghai lane street scene. The streets are lined with low, old buildings and markets. Residents hang out their clothes over the street. <http://www.dianping.com/shop/k5i6iSVVpCHQu55y>



Figure 32 A seafood merchant puts crabs on the ground. <http://www.dianping.com/shop/k5i6iSVVpCHQu55y>



Figure 31 Shanghai lane street scene. The streets are lined with low, old buildings and markets. Residents hang out their clothes over the street. <http://www.dianping.com/shop/k5i6iSVVpCHQu55y>



Figure 33 Big Joe's Market sign in the old days. <http://www.dianping.com/shop/k5i6iSVVpCHQu55y>

Typology of Shanghai market——Distributed Market

Definition: A uniformly managed market consisting of a number of scattered, unconnected buildings. Decentralized markets in urban centers generally consist of several small raw stores, while decentralized markets on the outskirts of cities are usually clusters of large wholesale centers.

Time of emergence: Decentralized food markets in urban centres emerge earlier. After the 20th century, the city government began to establish large wholesale markets in the suburbs.

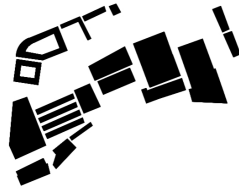
Location: Downtown or suburban area.

Surrounding environment: The decentralized market in the center of the city is surrounded by a complex environment with various functions, such as Qiujiang Road Vegetable Market, which is located in the center of the historic district of Old Lilong, with most of the buildings built in the early 20th century and dense urban fabric. The main body of the market is cut by the Metro Line 3 viaduct, while there are other small indoor markets along the surrounding streets. The decentralized markets on the outskirts of Shanghai are usually located along the city's main roads, close to the city's main entrances, with excellent traffic locations. For example, the Jiang Yang Agricultural Products Wholesale Market, located in Baoshan District on the outskirts of Shanghai, close to the exit of Jiang Yang North Road on the Outer Ring Road (A20), is a necessary route for the northeastern part of Shanghai to enter the city and to the central areas of Puxi and Pudong. The large wholesale market groups in the freight, loading and unloading activities usually generate a lot of noise, meat, fish and other food processing will also have bad influence on surroundings, so there are almost no residential areas around, usually car markets or other industrial manufacturing plants, and even many wholesale markets are located along the river. They were isolated from the surrounding environment through the river, and set up bridges to connect with the city, this also makes the image of large wholesale markets in the city is very prominent.

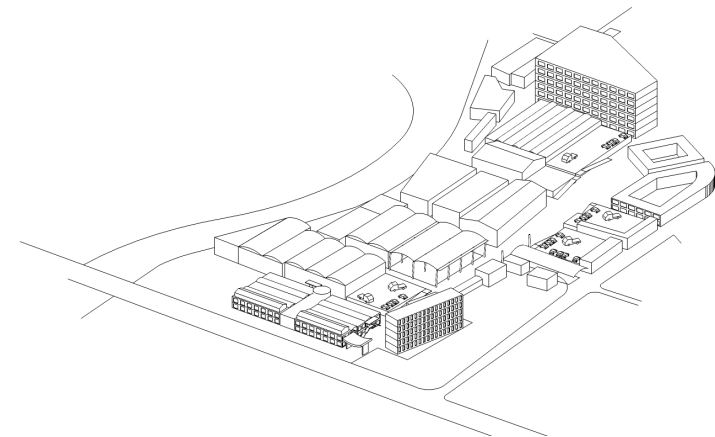
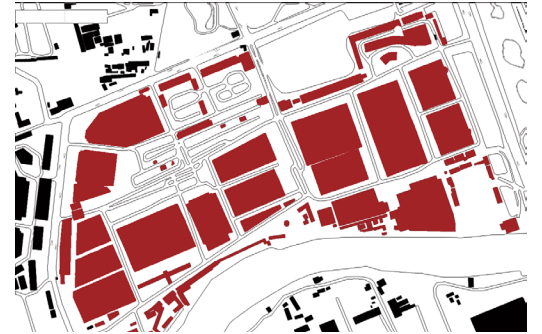
Auxiliary facilities: The decentralized vegetable market in the city centre has similar facilities to the auxiliary vegetable market. By contrast, The large wholesale markets have a lot of important facilities, including electronic trading platforms, food information centers, food safety testing centers, multi-storey parking buildings, etc.

Architectural features: Because the number of buildings that make up the decentralized market is not certain, the size of the decentralized market cannot be determined. But the large wholesale markets located in the suburbs cover a very large area, which can reach about 50,000 square meters. The buildings in the group consist of commercial streets for small merchants, comprehensive wholesale area for trading agricultural products such as large vegetables, fruits, grain and oil, local specialties, meat and other products, a supporting commercial area and a multi-storey garage. The fruit and vegetable lobby is usually the largest in footprint, while the garden-style decentralized vegetable market's fruit and vegetable lobby is often a semi-open space - a wall-less enclosed space under a simple steel structure canopy. The fruit and vegetable hall is well ventilated naturally. Other facilities that require complex processing or refrigeration, such as meat and aquaculture, are largely housed in enclosed indoor spaces, and the building structure is generally reinforced concrete.

Population served: The wholesale markets on the outskirts of the city generally do not serve the local population, but rather the small-scale food traders scattered around the city. The wholesale markets import large quantities of goods from agricultural production sites around the city, and small urban traders go to the wholesale market at around 5 a.m. every morning and leave at 7 a.m. to transport food to the city centre.



NAME: Jiangyang Wholesale Market
AREA: 65000 m²
FUNCTION: Wholesale Market+retail+Hotel



NAME: Fushan Market
AREA: 4000 m²
FUNCTION: Market

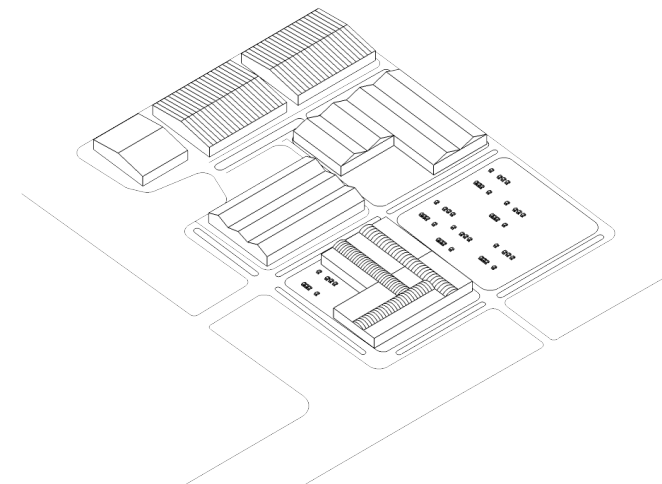
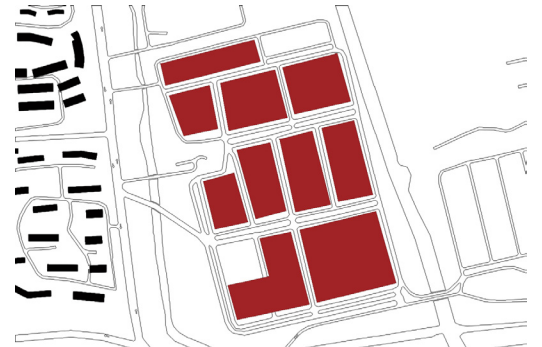




Figure 34 The Entrance of Jiangyang Wholesale Market.<http://www.dianping.com/shop/k5i6iSVVpCHQu55y>



Figure 36 The vegetable trade area in Pudong Wholesale Market.<http://www.dianping.com/shop/k5i6iSVVpCHQu55y>



Figure 35 The trading area of self-employed wholesalers in the Jiang Yang Wholesale Market.<http://www.dianping.com/shop/k5i6iSVVpCHQu55y>



Figure 37 Vendors import food in the open-air trade area in Pudong Wholesale Market.https://www.sohu.com/a/124160995_355441

Chapter III

Perspective

The Current Challenges of the Shanghai Food Market

1. Growing distance between vegetable markets and urban agriculture

Due to the rapid growth of the city of Shanghai in recent years, the expansion of the city’s size has led to a continuous decline in agricultural land closer to the city center. Many suburban areas have only scattered agricultural land. Although some districts and counties have increased the area of grain cultivation so far this year, but close to the central city of Minhang District, Baoshan District, Jiading District, Qingpu District and Songjiang District have a greater degree of reduction, of which Baoshan District and Minhang District of grain cultivation area has little left. As urbanization advances, some of the arable land used for food cultivation in districts and counties adjacent to central urban areas is likely to disappear altogether. Shanghai’s food production is increasingly dependent on far-flung suburbs such as Chongming and Fengxian, as well as large agricultural production sites in other Chinese cities. With the exception of more perishable foods such as vegetables and fruits, Shanghai no longer produces much of its own food. Although with the development of modern logistics technology, the food needs of the urban population can already be met by long-distance transport, but the increase in the distance of food from the place of production to the point of sale in the vegetable market and then to the consumer’s table, obviously leading to an increase in the cost of transportation, with the consequent increase in food prices. In addition to this, the increase in transport distances also implies an increase in food transit links, the presence of food intermediaries is also likely to increase food prices, and small traders in vegetable markets have to sell goods at higher prices, which may also lead to a reduction in the profits obtained. In contrast, large supermarket chains generally have their own exclusive production sites and efficient food transport logistics systems. Prices in large supermarkets are sometimes lower than in the market, the market does not have an advantage in terms of commercial competition and in addition, the increase in food miles obviously leads to an increase in carbon emissions such as trucks during transportation, which is very unfriendly to the ecology. Agricultural far-away production also means that there are now few self-producing traders in the market, and merchants have to go to the wholesale market early every morning to buy vegetables in bulk and then sell them in the city centre. As a result, agricultural production sites that are further away from the original urban centres are not beneficial for the development of vegetable markets.

2. Poor shopping environment in the old town vegetable market

In terms of the market’s surroundings, the market in the old

part of the city is no longer able to meet the demand of the existing markets due to the long history of the neighbourhood and the fact that the surrounding urban facilities have not been updated and are gradually aging and decaying. For example, in some areas with high building densities, there is generally no place to build parking for the market again. Many consumers’ private cars, bicycles and motorcycles are parked randomly at the entrance to the market and the surrounding area, blocking the streets and disrupting public order. Many itinerant market vendors take the liberty of erecting temporary structures around them to sell food. Inside markets, especially those located on the ground floor of buildings, light and ventilation are limited and the interior is dim and sometimes smells unpleasant. Some market roofs were built with simple makeshift structures and now have leaks. Some vegetable market floors are simply treated with cement, without tiles or easy-to-clean paint. All of these give consumers a poor shopping experience.

3. Competitive influences from modern supermarkets

The emergence of modern supermarkets poses a great threat to the survival of traditional markets. Firstly, supermarkets are standardized and unified management, with standard supporting facilities, the shopping environment is generally better than the wet markets; Secondly, supermarkets have a wide range of goods for sale, in addition to food, groceries, electronic products, books and so on, to fully meet the shopping needs of consumers; Thirdly, the food sold in supermarkets have more safety guarantee. Because supermarkets are generally large enterprise companies, which have their own production sites and modern refrigeration facilities, unified processing of food, unified packaging, and strict regulations on food quality, while the market food sellers are small individuals, food supervision is not as strict as that of supermarkets, so some sellers rely more on the supermarket food quality. Fourthly, supermarkets are open longer than vegetable markets. In Shanghai, large supermarkets are generally open from 7:30 a.m. to 11 p.m., which can better meet the needs of the shopping crowd at different times, but the vegetable market is usually closed only in the evening, which makes more office workers who do not have time to shop during the day choose to go to the supermarket to buy food; fifth, consumers can choose their own products in the supermarket to shop, which reduces the purchase pressure brought by face-to-face communication with vendors, and now many supermarkets have also realized the transaction process of self-checkout, even online shopping program, which greatly saves the shopping time.

1.A Market Mixed with Urban Farming

Thinking in terms of the food consumption system, urban agriculture is the production end of food, transportation is the distribution end of food consumption, and markets are the sales end of food consumption. Combining an urban farm with a market allows the food system to be completed in one building, not only with less energy loss and increased costs associated with intermediate transportation, but also with increased food storage and food abundance at the vegetable market.

More importantly, in the traditional spatial sense, the countryside and farmland are generally distributed around the city. By introducing agriculture to the city, changing the relationship between the countryside and the city, modern industrialized agricultural techniques can better integrate the city and agriculture. Farming is an important industry to feed the urban popula-

tion, and farmland will only be better able to provide food for the city if the city can take better care of it.

2.A Market Mixed with Metropolitan Transport System

Whereas in the past the city center market was always associated with the transportation hub, as land prices around the transportation station rose, the vegetable market was gradually replaced by large businesses that could get higher rents. When vegetable markets are combined with agriculture, their food abundance increases and their attractiveness to people becomes a regional “magnet” again.

Proximity to important urban transportation hubs allows for faster transportation of food to the vegetable market, and people can get to the market to buy food through easier transportation, increasing the accessibility of the vegetable market.

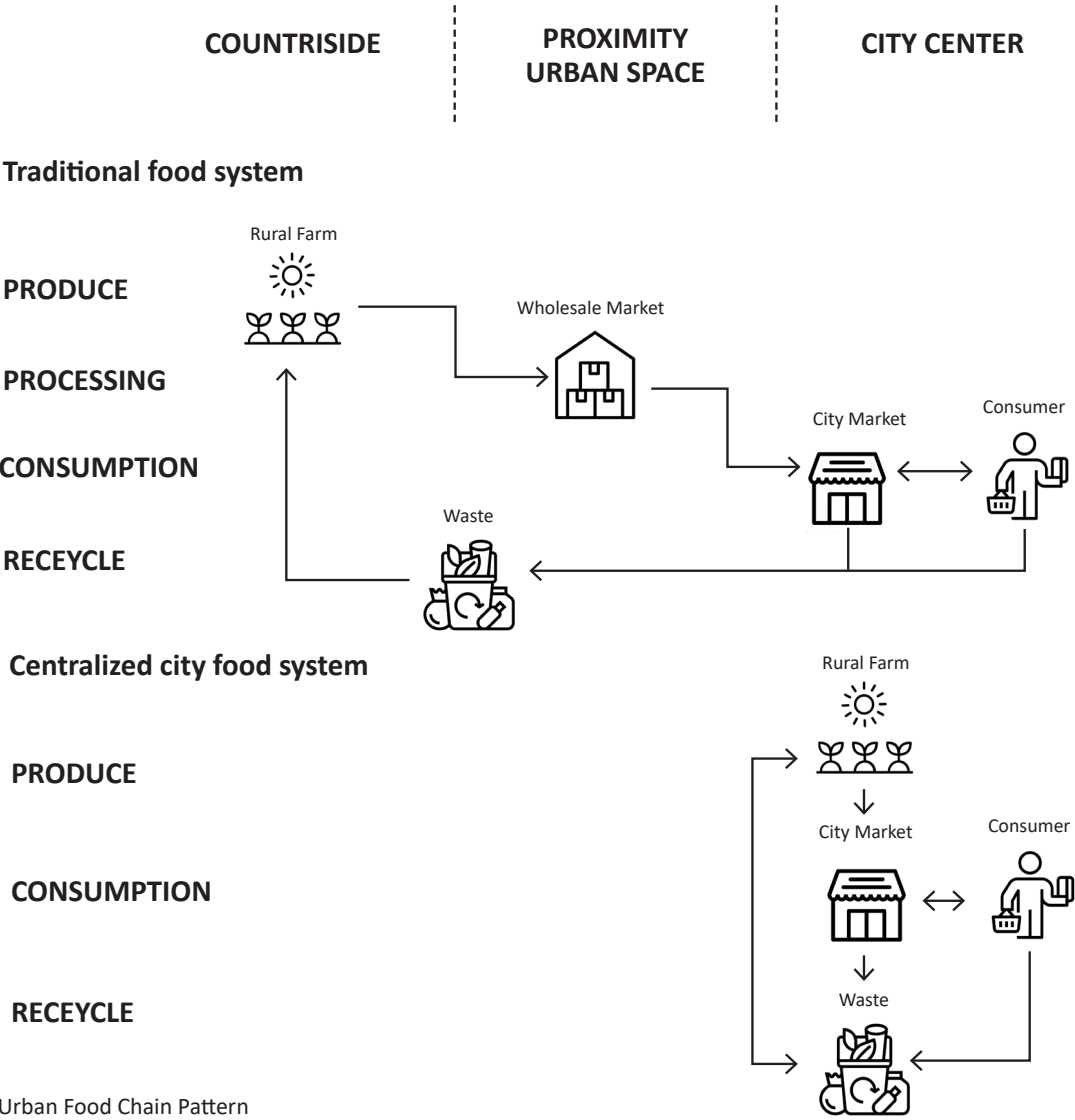


Figure 38 Urban Food Chain Pattern



History

Qiujiang is the old road of Wusong River. In the Ming Dynasty, the river was diverted due to serious siltation, so the original river was called the Old River, and after 1914, as the river was gradually submerged, the government authorities began to fill in the river to build the road. The pronounce of Qiujiang road means “old river” in Chinese.

Qiujiang Road has always been regarded as one of the many geographical boundaries of Shanghai. During the Yongzheng period of the Qing Dynasty, the boundary between Shanghai and Baoshan counties was divided by Qiujiang River, with Shanghai County in the south and Baoshan County in the north. In 1899, the last expansion of the public tenancy boundary took place along Wujin Road and Qiujiang Road to the north. Qiujiang Road then became the dividing line between the Public Tenancy Boundary and the Chinese Boundary.

Due to the lax management of the demarcation line by the

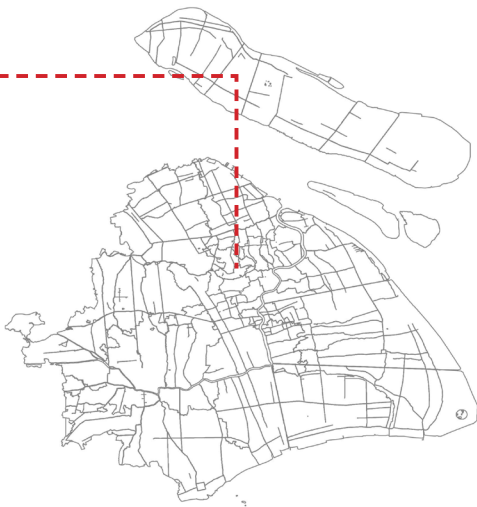
administrative departments on both sides and the geographical location of Qiujiang Road connected with the railway station, Qiujiang Road has gradually become a market for foreign goods and black market in Shanghai. Yip Cheng Chi, a famous modern Chinese buyer and industrialist, started his career at Qiujiang Road. Here he had sold a large quantity of old hardware and old tools from foreign ships. These old utensils are imported goods of great value and are sold openly in the rental sector, which is interfered with by the Bureau of the Ministry of Industry, while areas such as Qiujiang Road, which is not in charge, are the best places to sell them.

Before the war, Qiujiang Road was already a large market. The area between Guangdong Street (now Xinguang Road) and Gongjiake Road and Zhongzhou Road is lined with stalls. After that, the size of the market was gradually expanded and spread around Qiujiang Road in Hongkou District, starting from Sichuan

North Road in the east and reaching Qiujiang Road in the west, covering an area of about 2000 square meters.

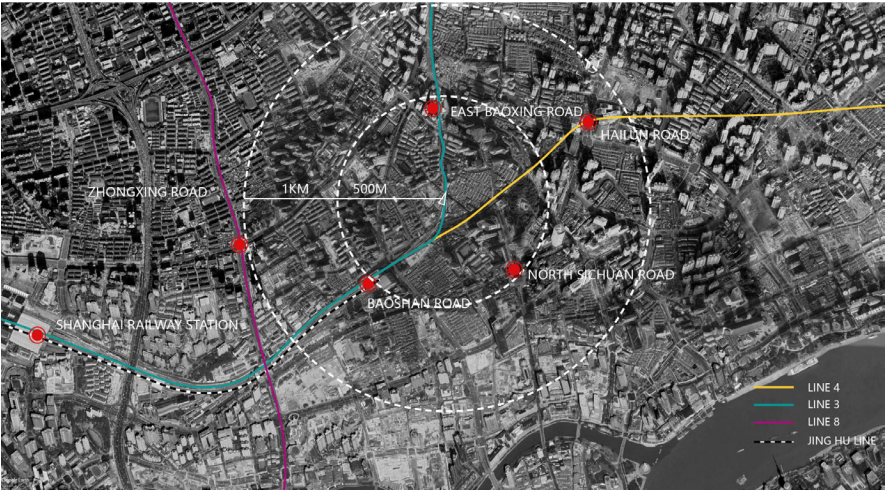
After the victory of the War II, the nationals of the defeated countries would be repatriated to their home countries, and Japanese expatriates would sell large quantities of furniture and leftovers from the US military. At the same time, all kinds of used goods and industrial products from the society are also gathered at Qiujiang Road. The Qiujiang Road is the best place to sell goods and the second-hand market is growing.

However, there are many illegal buildings in Qiujiang Road Market, which seriously affect the surrounding environment. In the first half of 2018, many illegal buildings on Qiujiang Road were gradually demolished. News that the market would become a place of memories has been spread.



Current Situation

Qiujiang Road Food Market is located in the center of the surrounding community, at the intersection of three city roads, namely Baoyuan Road, Xinguang Road and Chuan Road. There are three metro stations within 500m of the market perimeter, with the main part of the market adjacent to the Line 3 and Line 4 metro viaducts. The surrounding areas are mostly old Lilong in Shanghai, such as Hengxing Square in Dadri and Laianli Tenth Street, with smaller buildings of two to four storeys. There are a number of small retail shops and mobile stalls around the market and the market is partially added to the lower part of the viaduct. Looking at the urban fabric, it is obvious that the surrounding buildings are cut by viaducts, and underneath the viaducts are mostly green open spaces inaccessible to people, or used for parking, very negatively. The urban space on either side is separated by the viaduct and the lost space below.



Pracitcal Cases & Technology Study

Research Center ICTA-ICP · UAB / H Arquitectes + DATAAE

The ICTA-ICP building, located in the UAB Campus (Universitat Autònoma de Barcelona), is a research centre in environmental sciences and palaeontology. In accordance with the research fields of the building users, they chose, from the beginning, a building prepared to give an ambitious response to the challenges of sustainability. The building, an isolated volume of five floors of 40x40m² and two basements, contains the following program: on the ground floor the hall, bar, classrooms, meeting rooms and the administration area; the next 3 floors hold the offices and laboratories; on the roof there are vegetable patches together with the resting areas. The semi basement holds the parking and the engine rooms while the basement contains the warehouses and other laboratories.

Structure

A long life and low cost concrete structure with a lot of inertia has been chosen as the main structure, contributing directly to the passive comfort of the building. The quantity of concrete has been optimized distributing its mass in favour of the thermal exchange. It uses a post-stressed concrete slabs with pipes in the central area where the air circulates, in order to build a lighter structure. At the top and bottom of the slab the thermal mass is activated by geothermal energy.

Materials

A mineral material with a lot of thermal inertia and long service life has been chosen for the structure combined with low environmental impact materials for the secondary partitions. its covering is polycarbonate instead of cold formed steel sections and LDPE respectively. It has been a priority the use of organic or recycled materials and dry constructive systems as much reversible and reusable as possible.

Skin

The concrete structure is wrapped and protected by a low cost exterior bioclimatic skin. By installing a greenhouse industrialized system that opens and closes its mechanisms automatically, the solar gain and ventilation are regulated. This way, it is possible to raise the interior temperature naturally and guarantee a base of comfort in the circulation spaces as well as in the in-between spaces.

Basements

The building also takes advantage of the contact of the two basements with the terrain to pre-acclimatize the air renovations of the building through two air chambers: one generated by “PI” beams that make up the retaining walls and the other, the air chamber underneath the basement floor.

Climate and management

The building has been designed to host three types of climates associated with different intensities of use: Climate A: in-between spaces, that are exclusively acclimatized/heated by passive and bioclimatic systems; Climate B: offices, that combine natural ventilation with radiant and semi-passive systems; Climate C: laboratories and classrooms that have a more hermetic and conventional functioning.

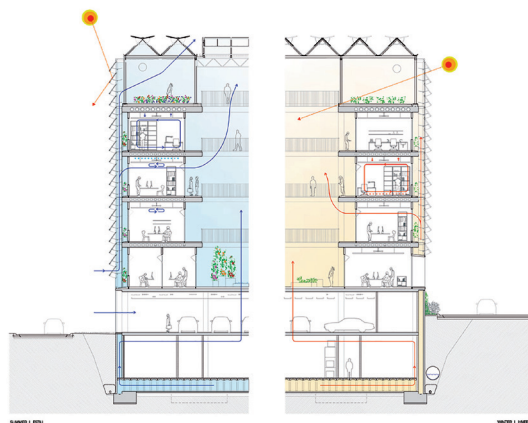


Figure 39 Economical system. H Arquitectes + DATAAE, ICTA(2014). https://www.archdaily.com/636587/research-center-icta-icp-uab-h-arquitectes-dataae?ad_medium=gallery

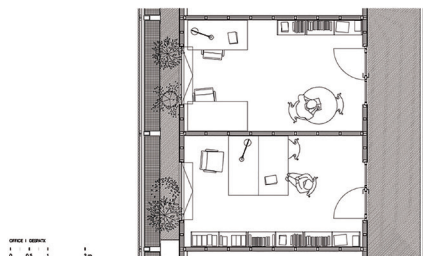
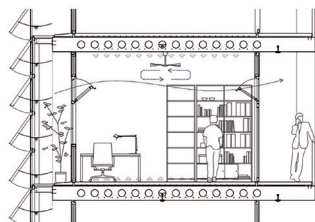


Figure 40 Office Unit. H Arquitectes + DATAAE, ICTA(2014). https://www.archdaily.com/636587/research-center-icta-icp-uab-h-arquitectes-dataae?ad_medium=gallery



Figure 41 Perspective. H Arquitectes + DATAAE, ICTA(2014). https://www.archdaily.com/636587/research-center-icta-icp-uab-h-arquitectes-dataae?ad_medium=gallery



Figure 42 Skin. H Arquitectes + DATAAE, ICTA(2014). https://www.archdaily.com/636587/research-center-icta-icp-uab-h-arquitectes-dataae?ad_medium=gallery

Vertical Farming System——Sky Green in Singapore

Sky Greens patented vertical farming system consists of rotating tiers of growing troughs mounted on a A-shape aluminium frame. The frame can be as high as 9 meter tall with 38 tiers of growing troughs, which can accommodate the different growing media of soil or hydroponics. The troughs rotate around the aluminium frame to ensure that the plants receive uniform sunlight, irrigation and nutrients as they pass through different points in the structure.

High yield
When compare with traditional monolayer farms, the Sky Greens patented vertical farming system intensifies land use and can result in at least 10 times more yield per unit land area.

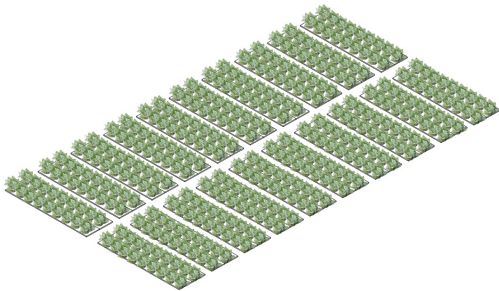
High quality
The structures are housed in a controlled environment which enables stringent control of input materials to bring about food supply, food safety, food security and food quality assurances.

High flexibility
Made of aluminium and steel, the modular structures are robust and yet highly customisable and scalable. Structures can be tailor-made to suit different crops, growing media and natural conditions, even allowing cultivation on originally non-arable lands.

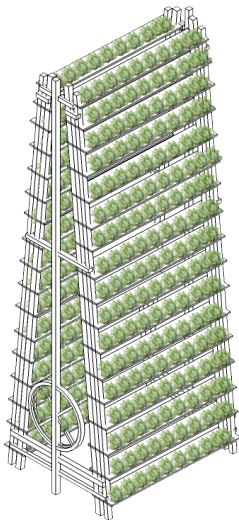
Low energy use
With the harnessing of natural sunlight, there is no need for artificial lighting. Rotation is powered by a unique patented hydraulic water-driven system which utilises the momentum of flowing water and gravity to rotate the troughs. Only 40W electricity (equivalent to one light bulb) is needed to power one 9m tall tower.

Low water use
With the plants irrigated and fertilised using a flooding method, there is no need for a sprinkler system thereby eliminating electricity wastage, as well as water wastage due to run-offs. Only 0.5 litres of water is required to rotate the 1.7 ton vertical structure. The water is contained in a enclosed underground reservoir system and is recycled and reused.

Low maintenance
Being housed in a protected environment ensures that the system can be relatively maintenance-free and have low manpower dependency. The rotating troughs and intensified plant to plot ratio also mean high manpower efficiency.



Traditional Growing



Vertical Growing

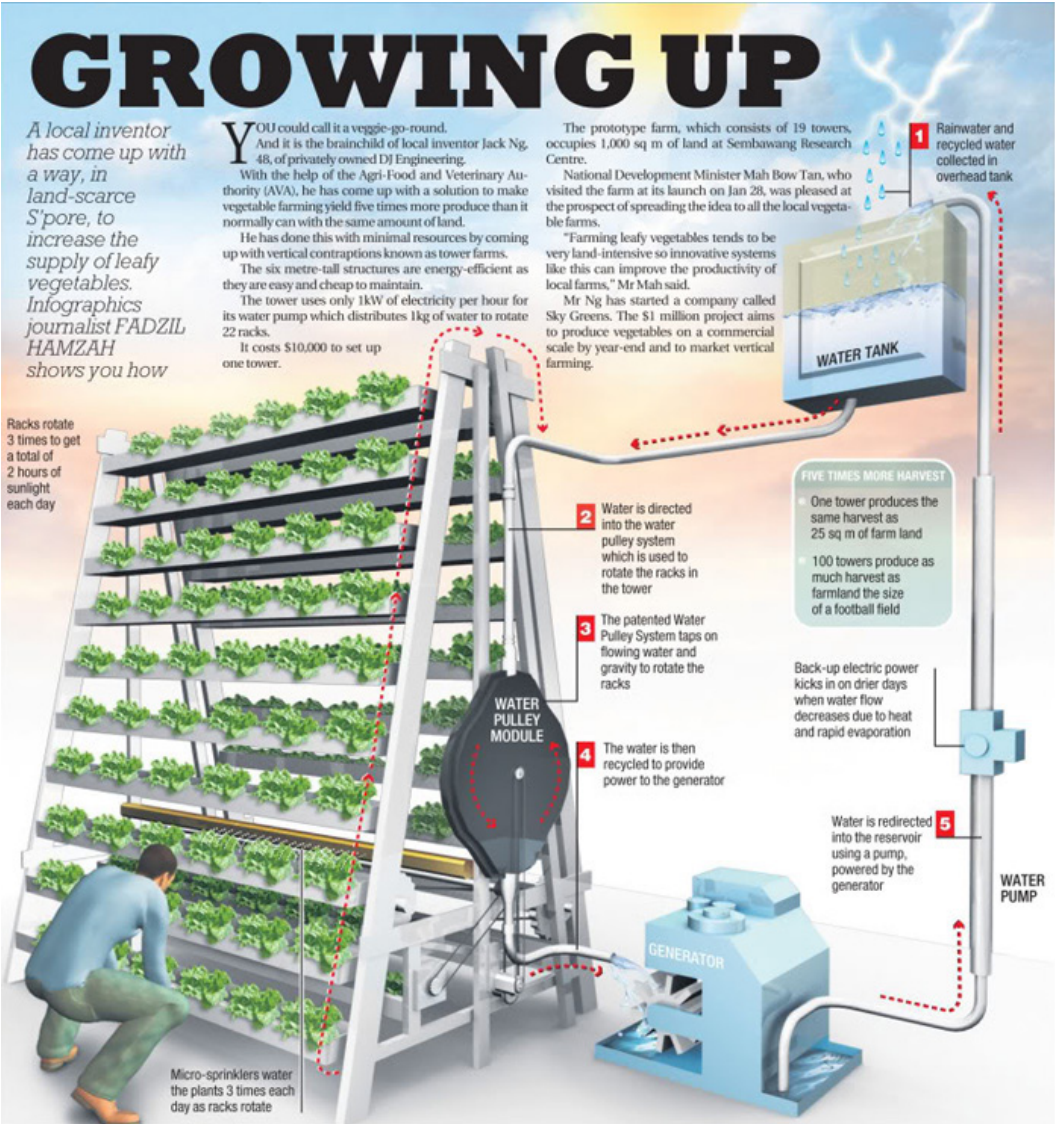


Figure 43 Circulation diagram. AGOGOFRESH, A-GO-GO. <https://agogofresh.com/pages/about-us>



Figure 44 Indoor growing spcae. AGOGOFRESH, A-GO-GO. <https://agogofresh.com/pages/about-us>

Aquaculture

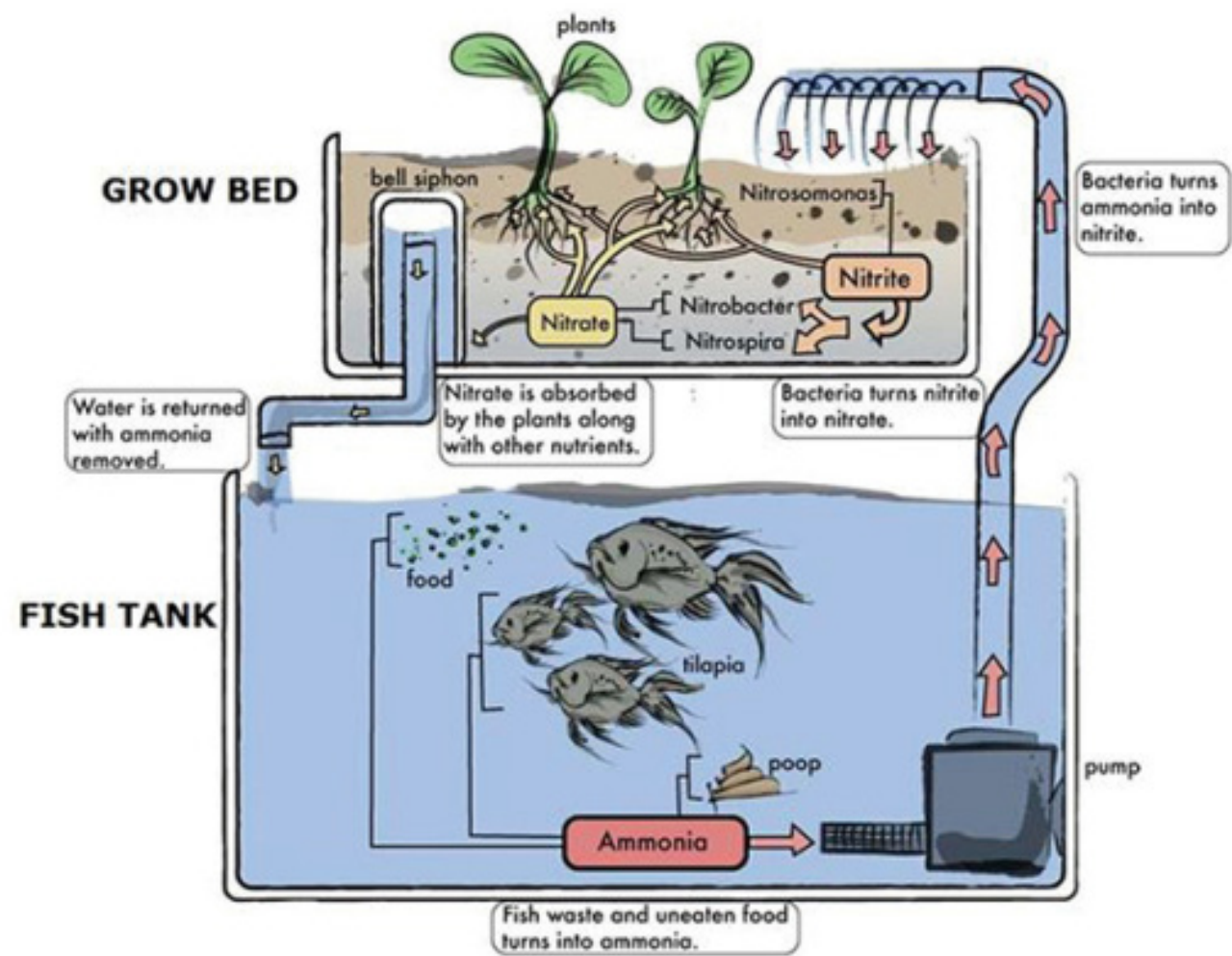
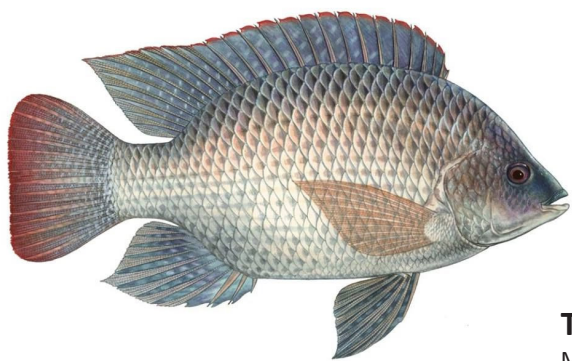
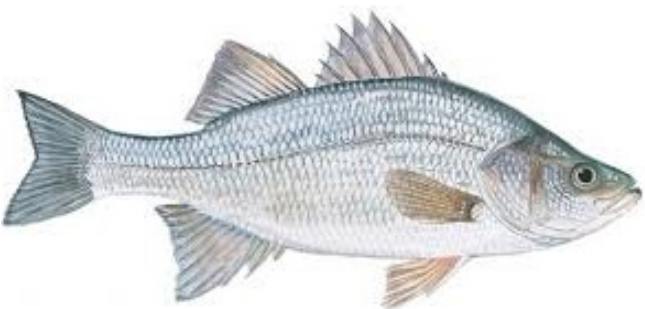


Figure 45 Aquaculture system working diagram. <https://www.books4yourkids.com/2016/10/under-earth-under-water-by-aleksandra.html>



Tilapia

May reach harvest size of 500g after 6 months, males typically being larger than females at each age.
Conditions: Tep: 24 °C, D.O: 3-8mg/l, pH: 6-8



Perch

Carnivorous, eat small fish, can be supplemented with live insects/worms.
Conditions: Tep: 24 °C, D.O: 3-8mg/l, pH: 6-8

Aquaponics is a new type of complex farming system, which combines aquaculture and hydroponics, two completely different farming techniques, to achieve scientific symbiosis through clever ecological design, thus realizing the ecological symbiosis effect of raising fish without changing water and normal growth without fertilizing vegetables.

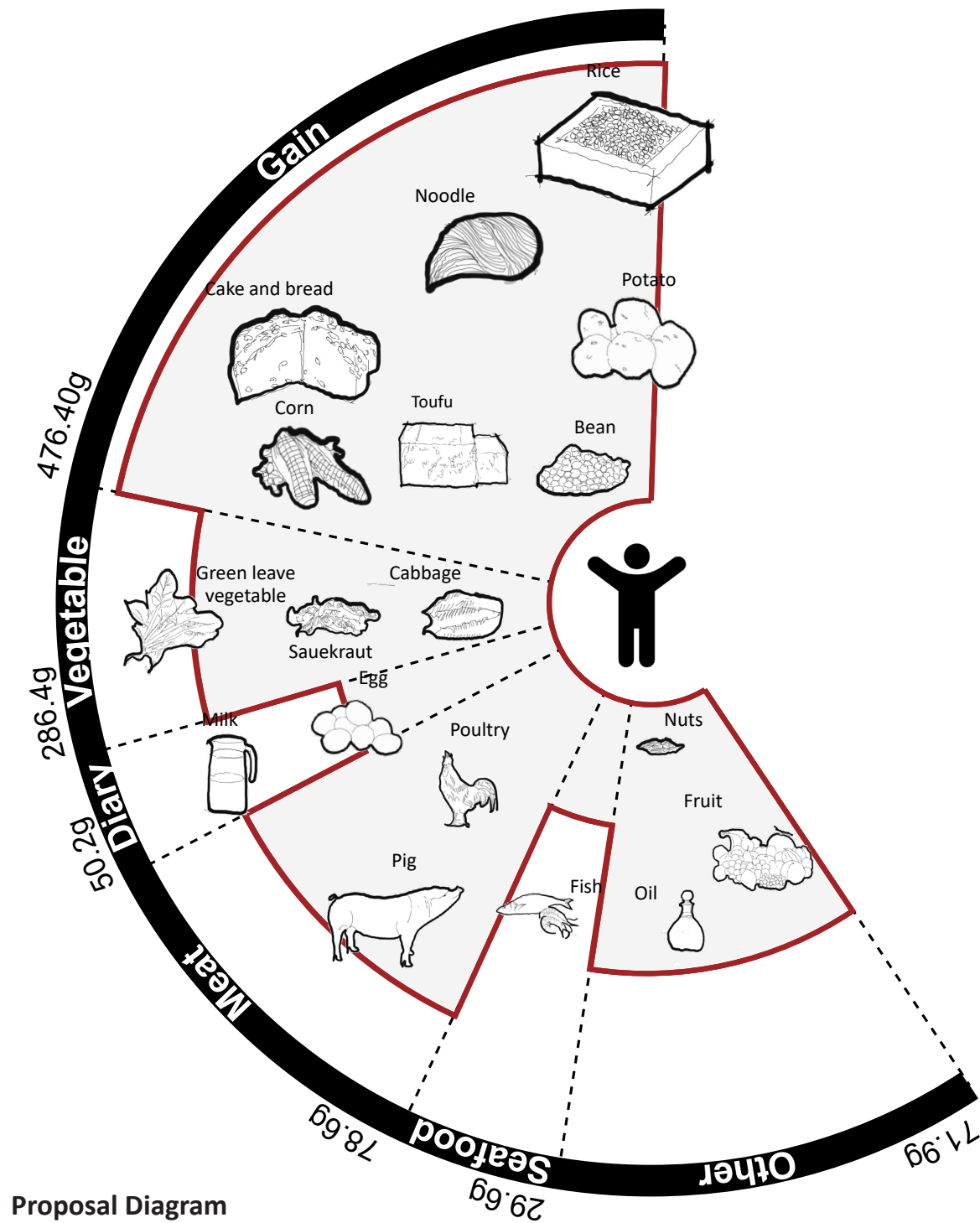
In traditional aquaculture, as fish excrement accumulates, the ammonia nitrogen in the water column increases and toxicity increases, which is then broken down by nitrifying bacteria into nitrate, which can be used directly by plants as nutrient uptake. Aquaponics allows animals, plants and microorganisms to achieve a harmonious ecological balance between

them, which is a low-carbon production model with zero emissions of sustainable recycling and an effective solution to the agroecological crisis.

Aquaponics is most attractive in three points: Firstly, it can be clean by itself. Because fish are present in the aquaponics system, no pesticides can be used, and the slightest carelessness can cause the death of fish and beneficial microbial populations and the collapse of the system. Secondly, aquaponics is separated from soil cultivation, avoiding heavy metal contamination of the soil, so that both vegetables and aquatic products in the aquaponics system have much lower heavy metal residues than in conventional soil cultivation. Thirdly, aquaponics system

vegetables have a unique aquatic root system, if the aquaponics farm distributes with roots, consumers can easily identify the source of the vegetable and avoid consumer doubts that this vegetable is not from the wholesale market.

As the aquaponic growing system will be located on the top floor, solar gain through the glass roof will provide a warm water environment. Tilapia and perch are chosen to be farmed in this case.



Proposal Diagram

People Eating Habit

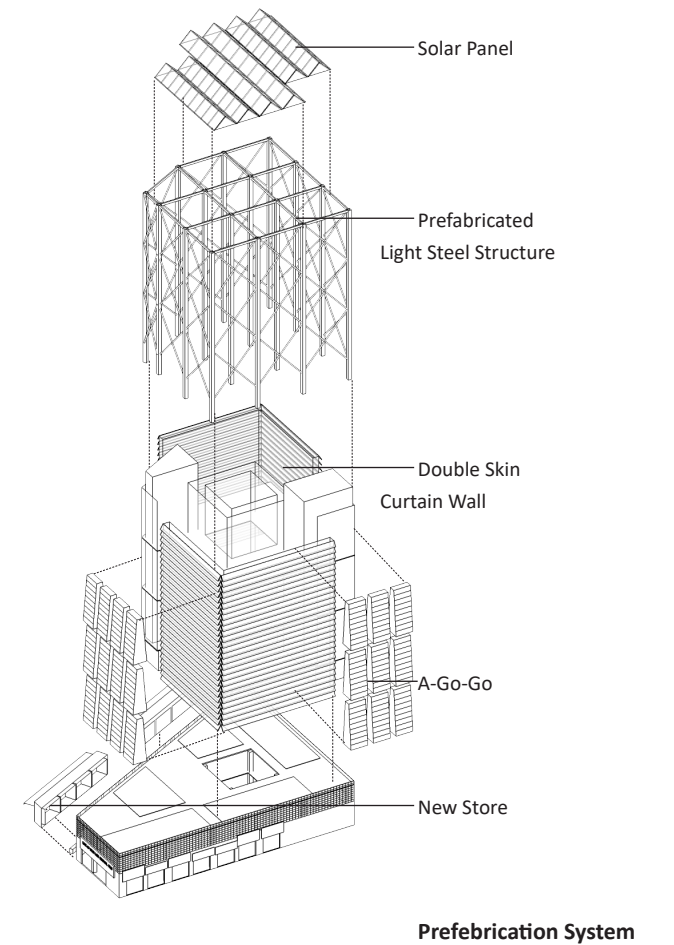
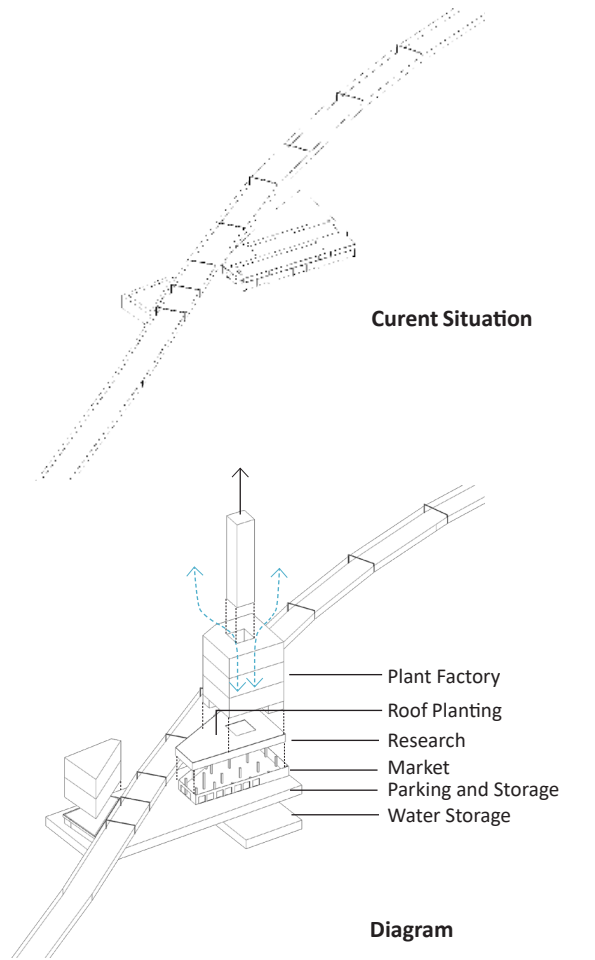
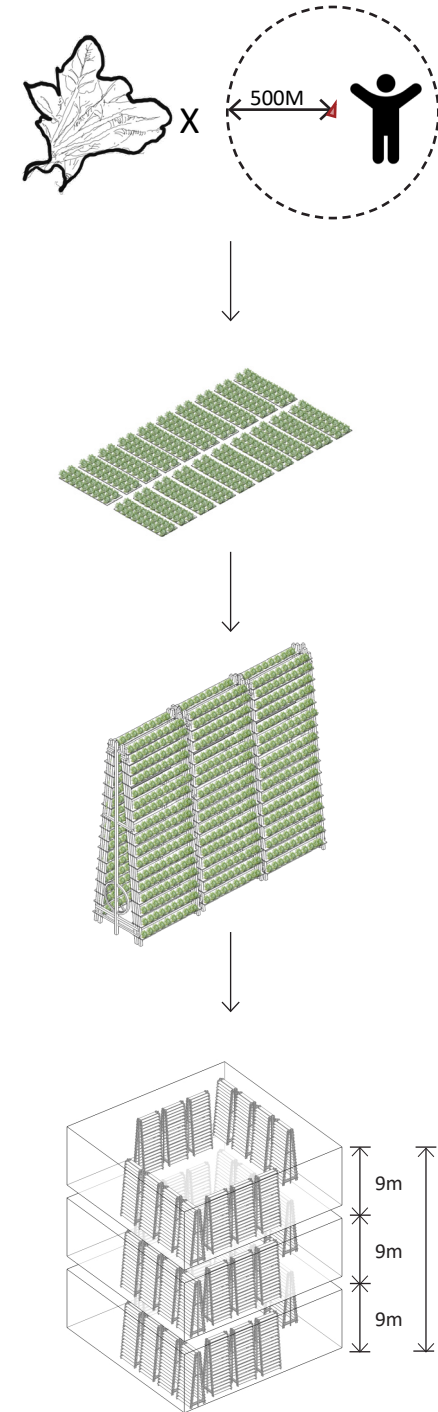
A Chinese resident's daily diet includes grains, vegetables, meat, dairy eggs, seafood and other foods. Grains are the primary source of energy. As people's standard of living improves, more and more types of food are eaten by each individual on a daily basis. According to statistics, the consumption of vegetables by Shanghai residents has increased rapidly in recent years. In order to meet people's demand for vegetables, the unit production of vegetables should be increased.

Planting Calculation

A Chinese resident needs 286.4g of vegetables in a day, the population density in Hongkou is 37065 people per square kilometre, the traditional method of growing vegetables per square metre is 30kg, to feed the community population within 500m of the market, it would require 8945.83 m^2 of land.

However, if grown with a vertical farm system (take Sky Greens' hydroponic shelf as an example), vegetables would yield more than eight times as much as traditional agriculture, requiring only 1,118.22 m^2 of land.

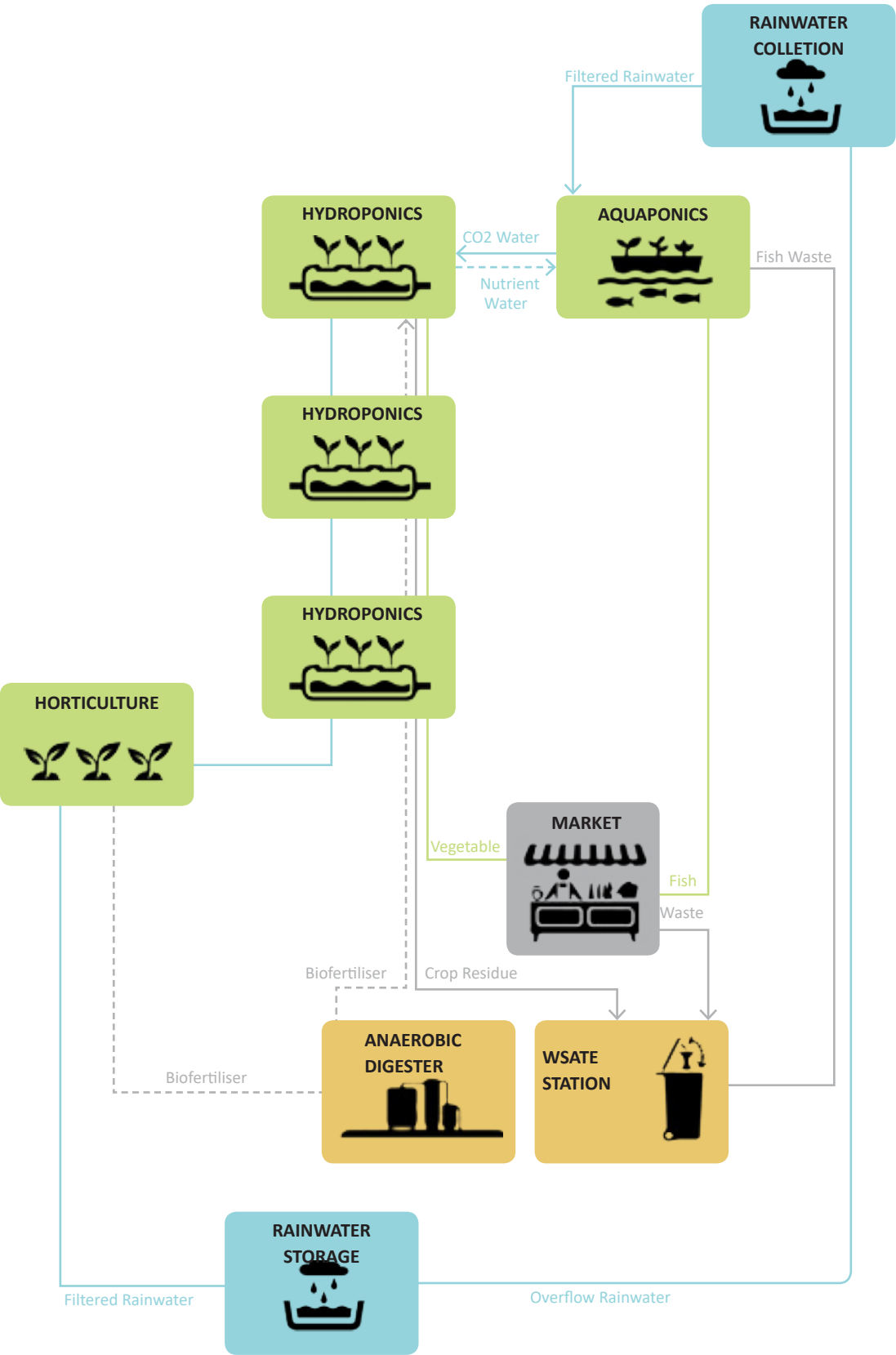
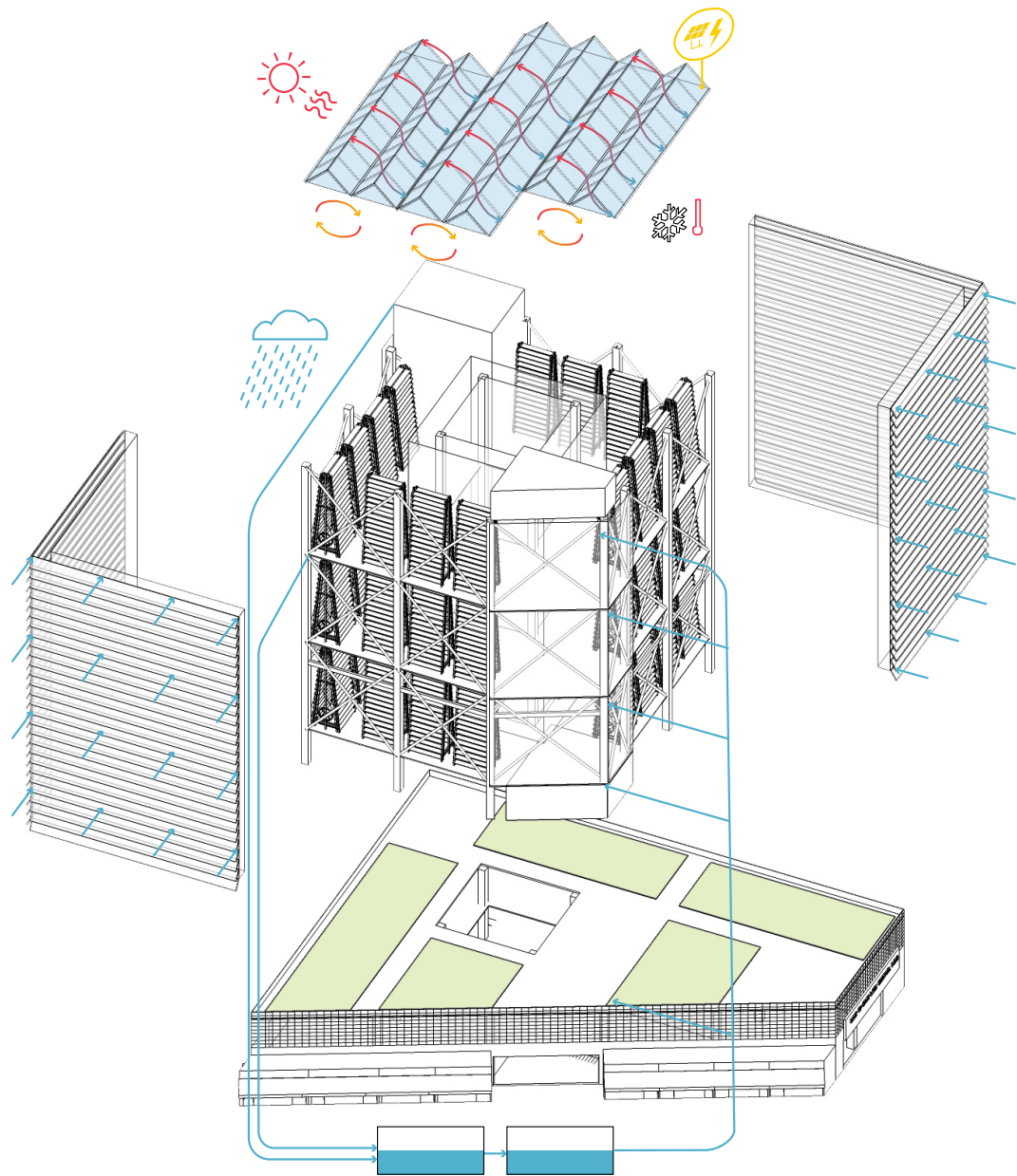
Based on the base plan, each floor of the vertical farm has a usable planting area of approximately 412 m^2 , and three floors need to be constructed to meet the needs of the people. As remain land can plant other vegetable for eating or landscaping.

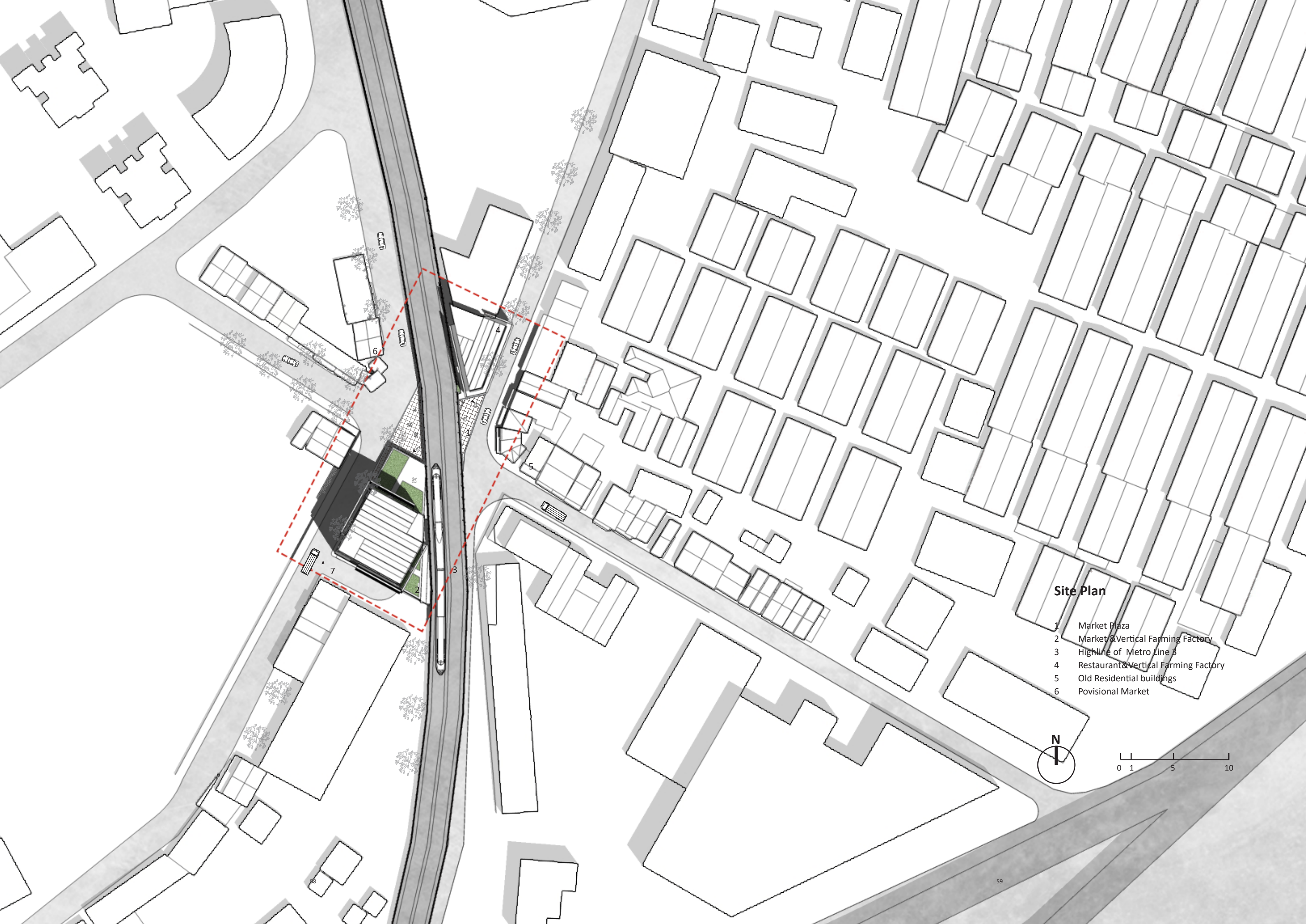


The Energy Sufficient System

Using a mixed symbiotic system with Horticulture, Hydroponis, Fungiculture and Aquaponics, the building is trying to achieve an ecological balance by itself. Water and air circulation between different systims is demonstrated by the diagram on the right.

Rainwater from the roof is collected and stored underground, and the rainwater and wastewater are filtered and used for secondary watering of plants. Solar panels on the roof collect electricity to provide to the building. There is also a garbage disposal center for recycling on the ground floor.



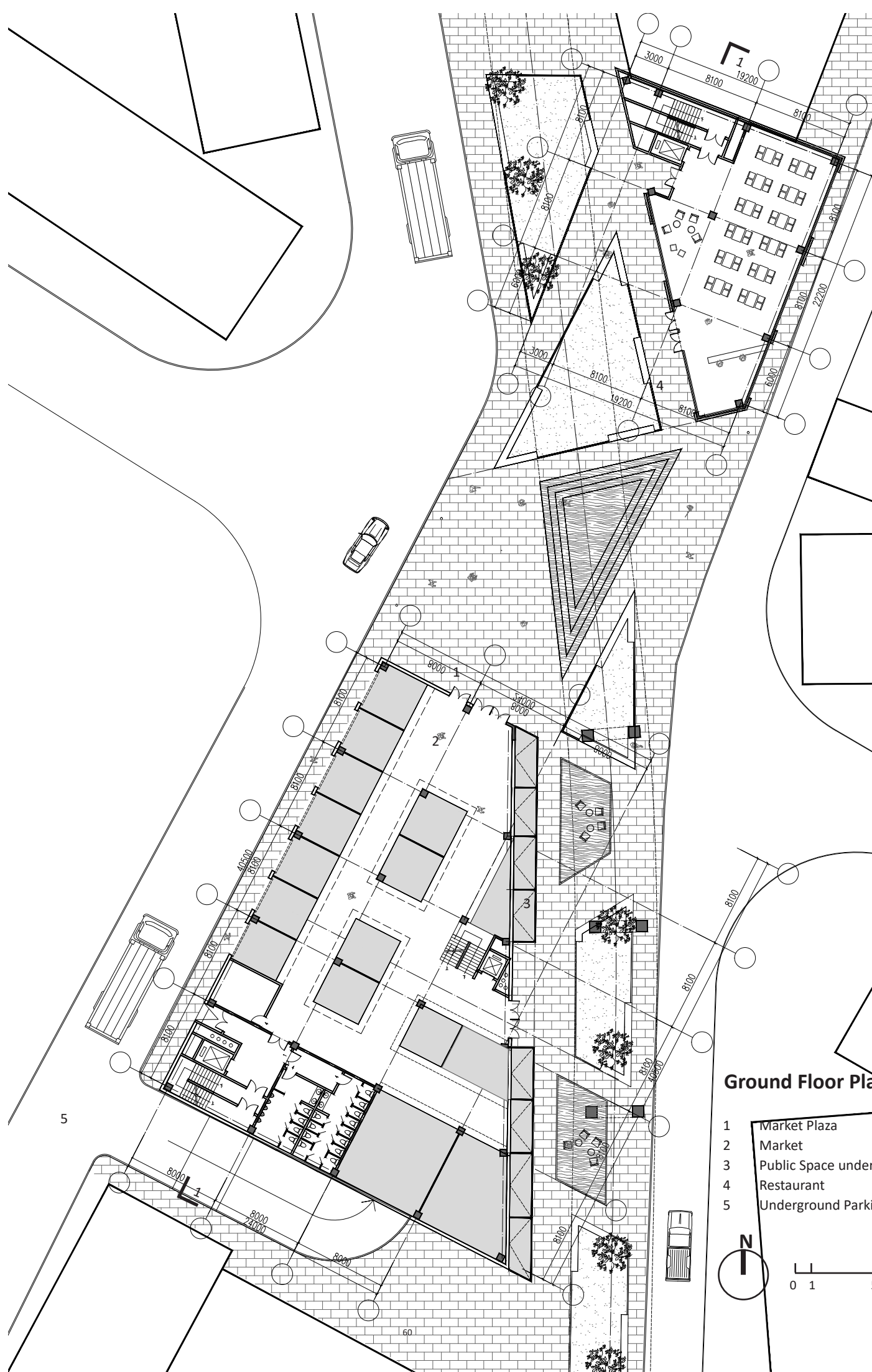


Site Plan

- 1 Market Plaza
- 2 Market & Vertical Farming Factory
- 3 Highline of Metro Line 3
- 4 Restaurant & Vertical Farming Factory
- 5 Old Residential buildings
- 6 Povisional Market

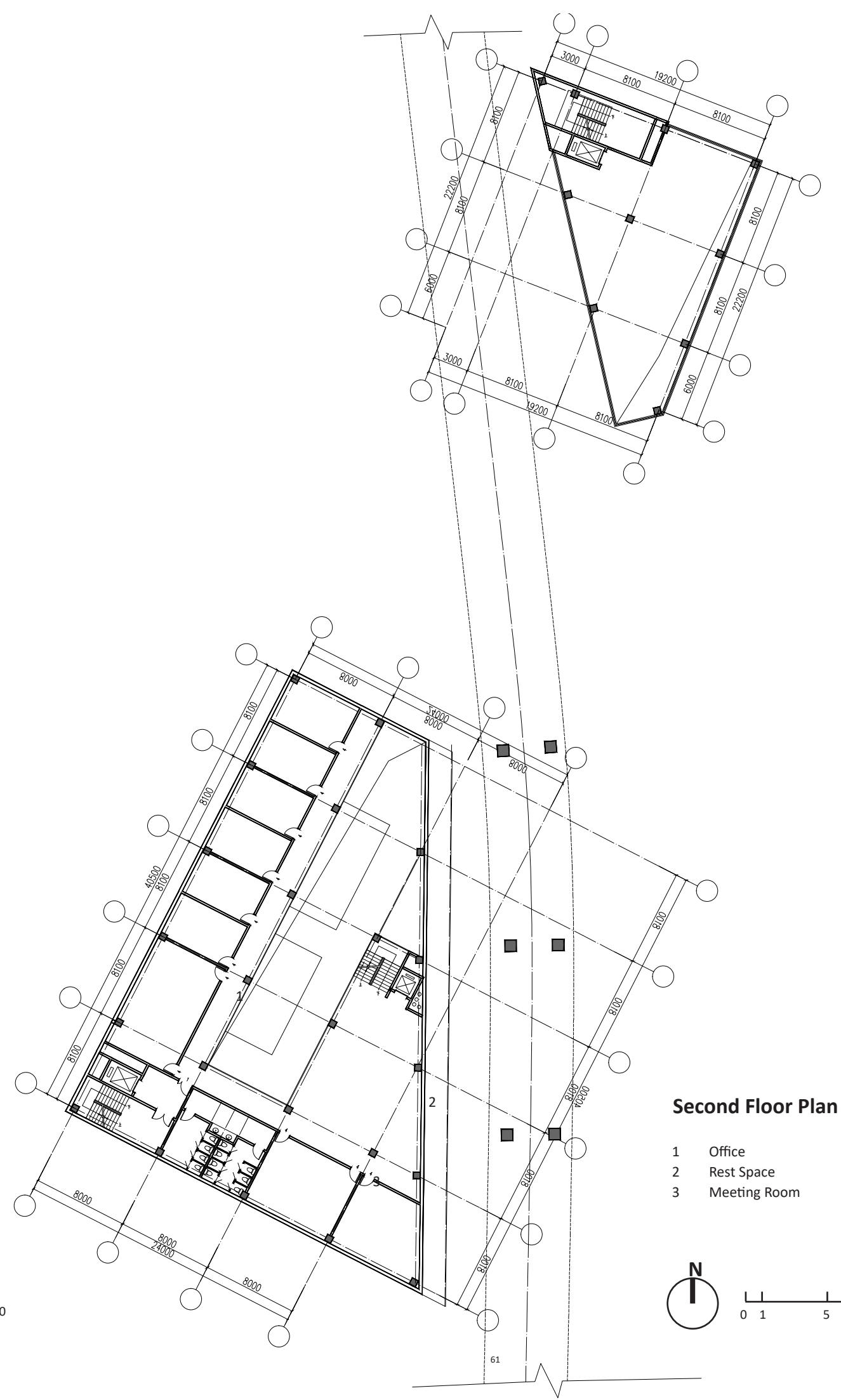
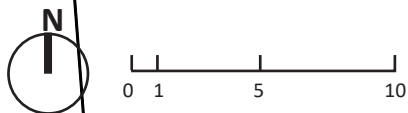


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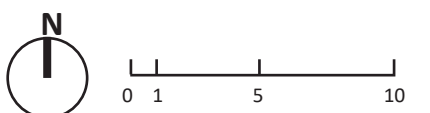
Ground Floor Plan

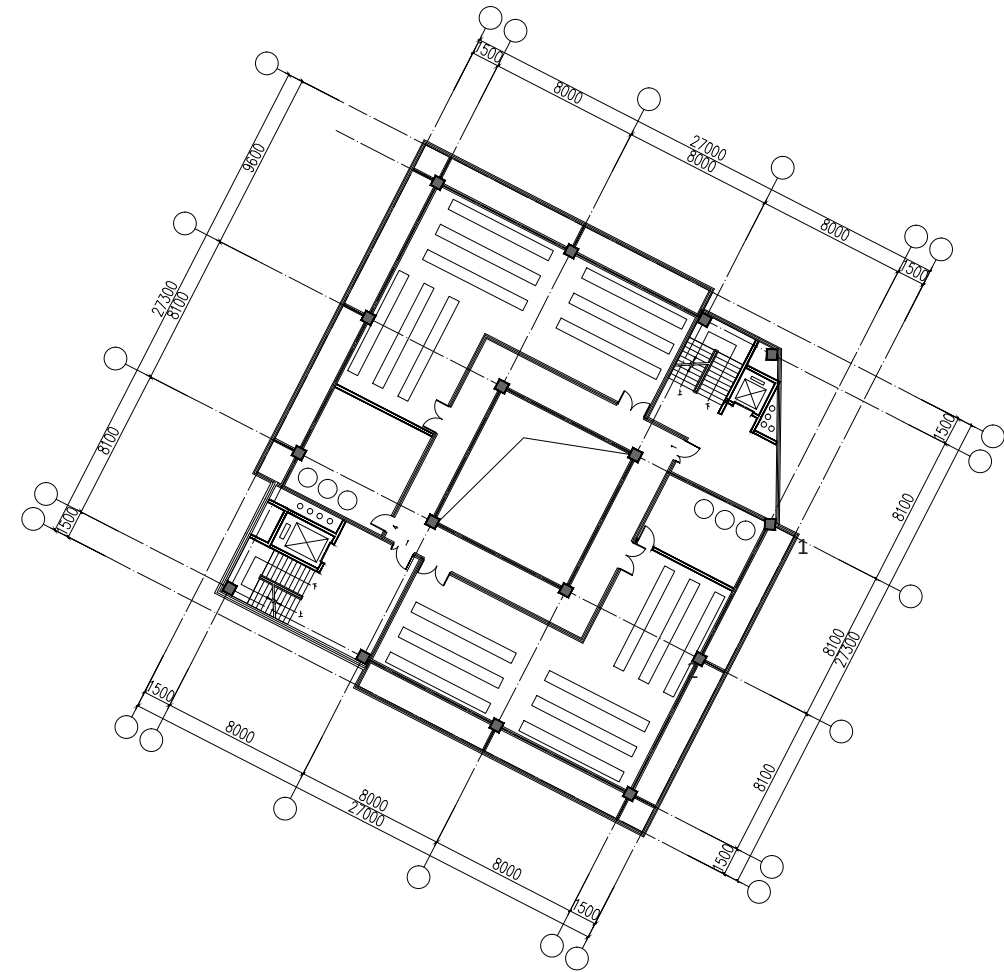
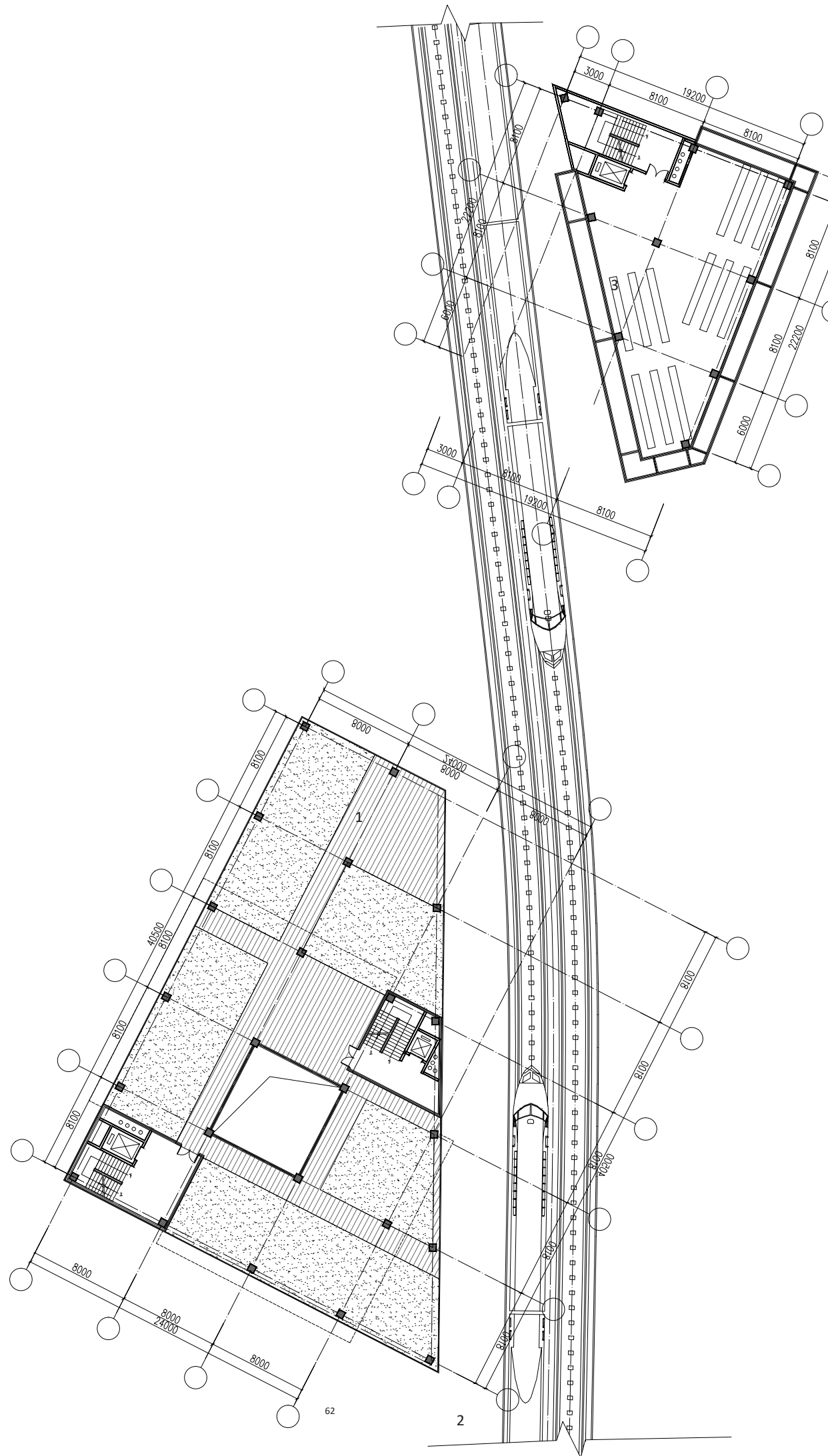
- 1 Market Plaza
- 2 Market
- 3 Public Space under Highline
- 4 Restaurant
- 5 Underground Parking Entrance

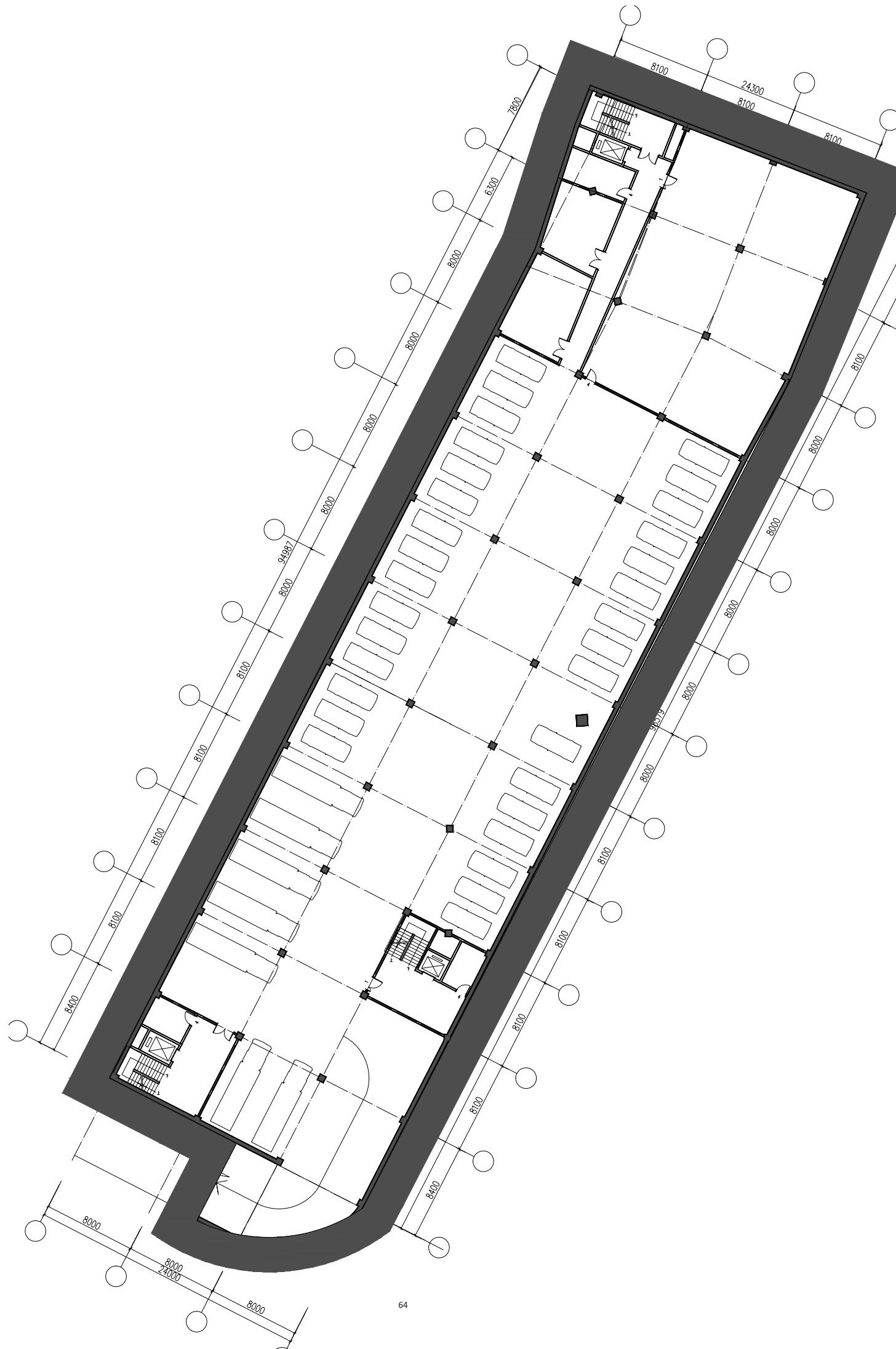


Second Floor Plan

- 1 Office
- 2 Rest Space
- 3 Meeting Room

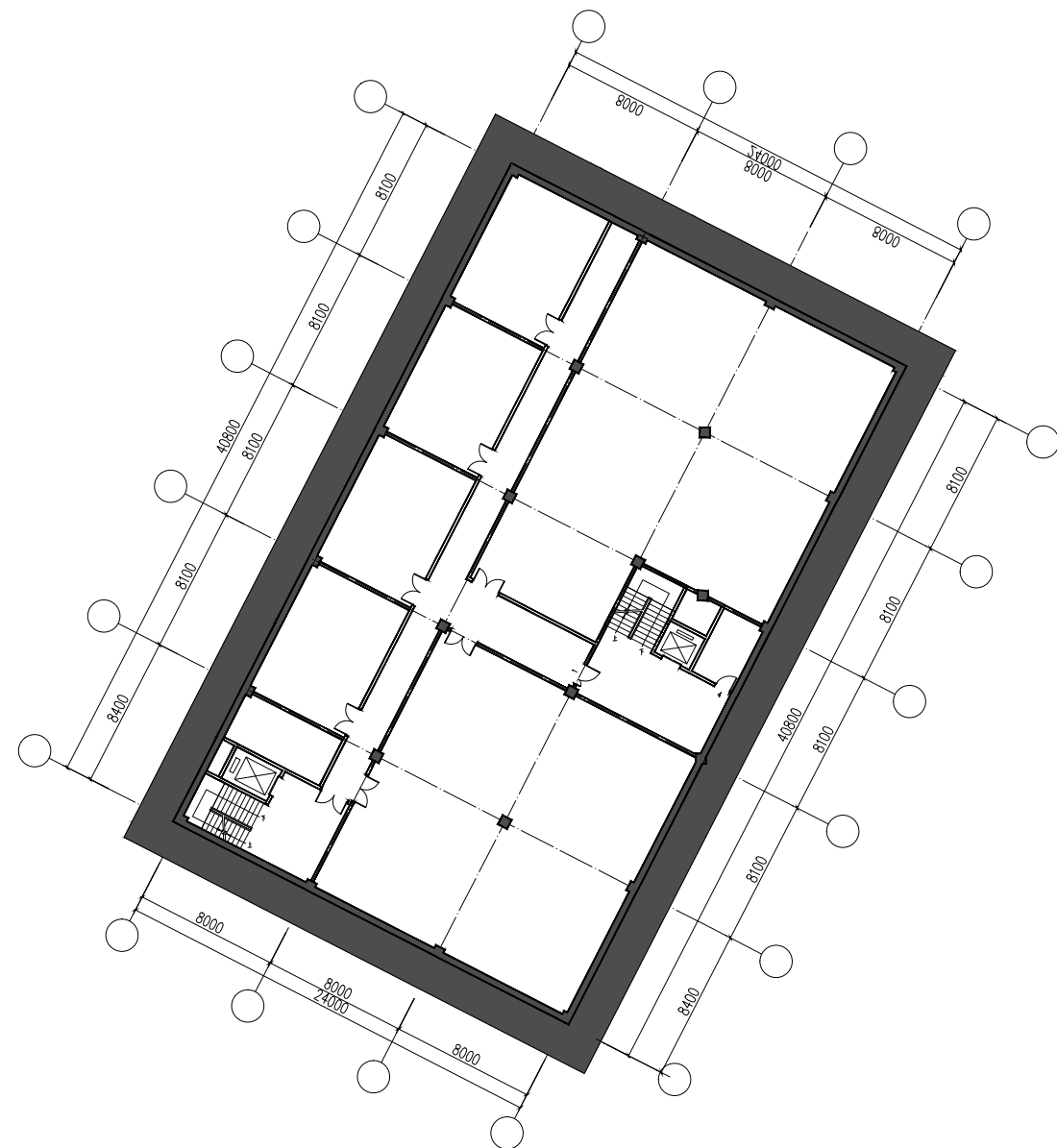






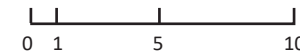
Negative One-Floor Plan

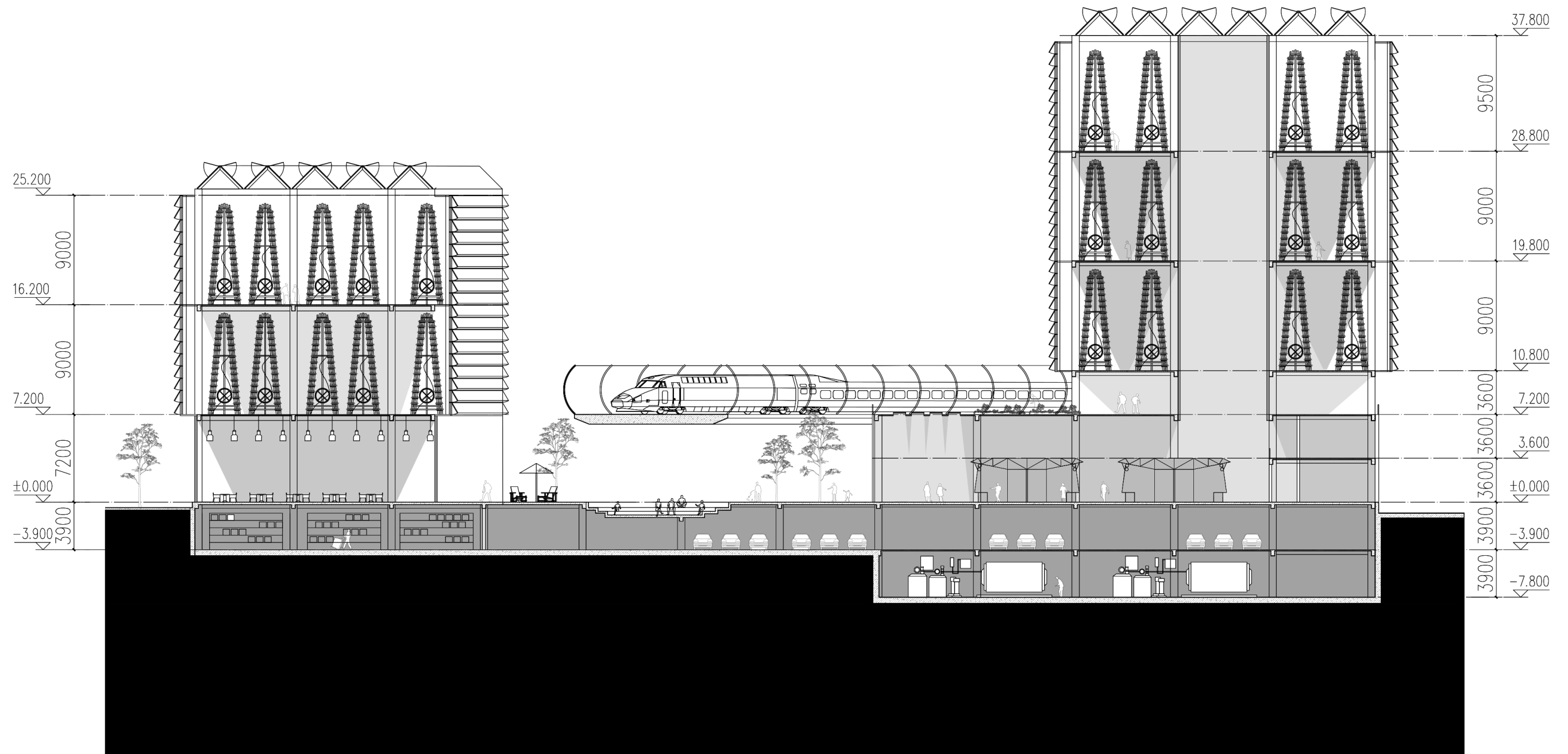
- 1 Parking
- 2 Ware House



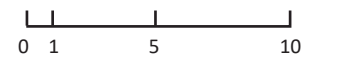
High Rise Unit Plan

- 1 RainWater Storage
- 2 Warehouse
- 3 Control Room



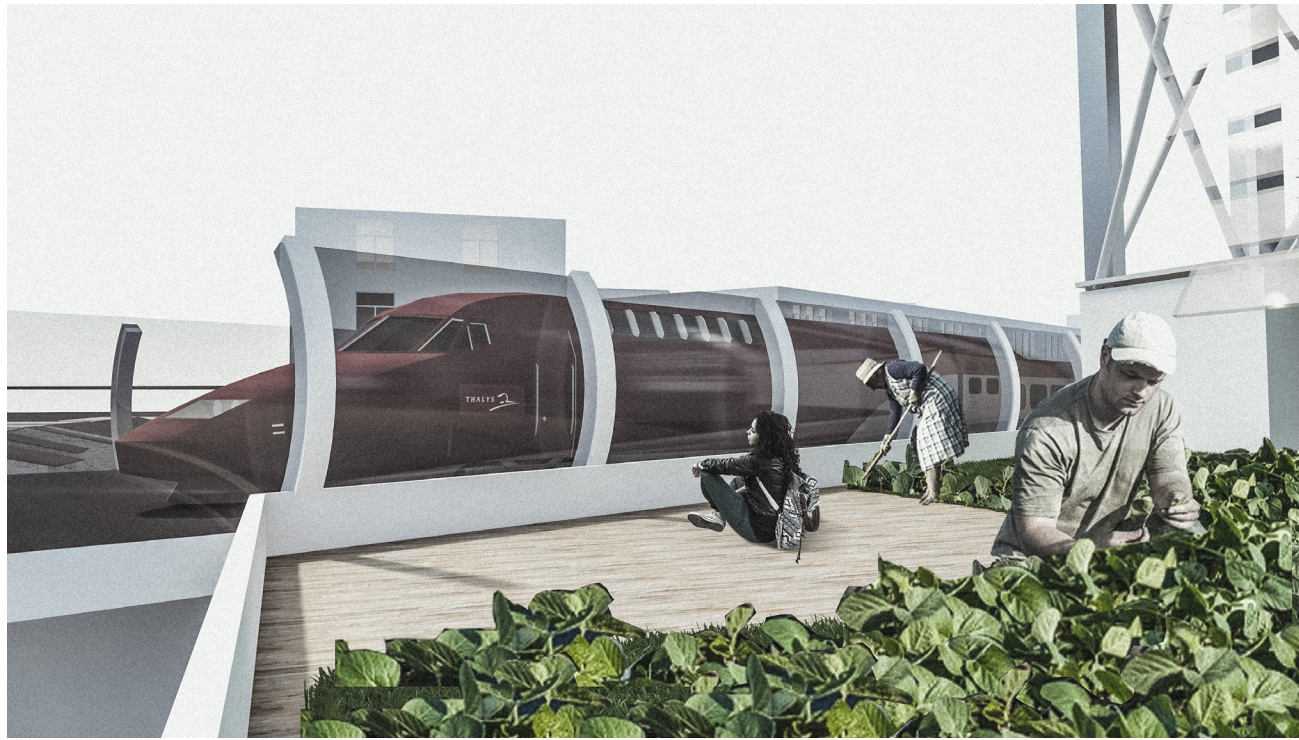


Section 1-1









Traditional agriculture on the roof top



Public space and market under highline



Plant factory



Indoor market

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